ADVANCED TRAINING MANUAL

Biological Assessment Preparation for Transportation Projects

Washington State Department of Transportation

May 2006

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1.0 Introduction

1.0 Introduction

This manual provides guidance to biologists who prepare biological assessment (BA) reports for transportation projects in the State of Washington with a federal nexus (i.e., receiving federal funds, occurring on federal lands, or requiring federal permits or approval). The manual defines and clarifies the essential components of BAs and the basic Endangered Species Act (ESA) Section 7 consultation process, and it also addresses special topics that require careful analysis when producing a BA. Where applicable, examples excerpted from published BAs are provided in this manual to illustrate how to address various topics in BAs.

The introduction section of this manual provides a summary of common flaws in BAs, the essential attributes of a successful BA, a brief discussion of the types of writing samples provided in this manual. PART 1 of this manual provides an introduction to the process of producing a BA report and the coordination of the various players in document production and review at the state, local, and federal levels. In addition, part one provides a brief overview of the required components or sections of a written BA.

PART 2 consists of topic-specific chapters that provide detailed information, discussion, examples, and guidance materials pertaining to each topic. The topics include specific BA sections that often pose problems for authors (e.g., the action area), as well as complex topics requiring further guidance (e.g., noise impact assessment and developing effect determinations).

PART 2 provides guidance on BA sections that are often problematic, including the following:

- Construction activities, impact minimization measures, and best management practices
- Action area
- Environmental baseline conditions: indicators and pathways analysis
- Indirect effects
- Cumulative effects
- Effect determinations.

Other chapters in PART 2 provide further guidance on complex topics:

- In-water work
- Stormwater
- Essential fish habitat

- Batched biological assessments and programmatic biological assessments and biological evaluations
- Standards for making effect determinations by species.

PART 3 includes standard information that may prove useful to authors in the preparation of BAs, commonly used reference citations, templates, and BA checklists. References to the guidance and documents provided in PARTS 2 and 3 are made frequently throughout this manual.

A compact disc included with this training manual provides the following source materials for use in preparing BAs and in other phases of Endangered Species Act compliance:

- Bull Trout Interim Conservation Guidance
- Essential Fish Habitat (EFH) Consultation Guidance
- Essential Fish Habitat (EFH) Excerpt from Amendment 11 to the Magnuson-Stevens Act (Federal Fishery Management Plans)
- Endangered Species Act Sections 2 – 18
- Endangered Species Act Section 7 Consultation Handbook
- National Marine Fisheries Service (NMFS) Matrix of Pathways and Indicators
- NMFS Critical Habitat Guidance
- Peregrine Document (U.S. Fish and Wildlife Service 1999)
- Programmatic Consultation Guidance
- The Habitat Approach to Implementation of Endangered Species Act Section 7 for Pacific Anadromous Salmonid Habitat
- U.S. Fish and Wildlife Service (USFWS) Matrix of Diagnostics/Pathways and Indicators (Bull Trout)
- USFWS Draft Bald Eagle Management Guidelines
- Local Agency Environmental Classification Summary (ECS) Form
- WSDOT Biological Assessment Form (Template).

1.1 Common Flaws in Biological Assessments

Washington State Department of Transportation (WSDOT) reviewers for the Local Highways and Programs department, as well as reviewers from the National Oceanic and Atmospheric

Administration, Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS), have determined the two most common BA flaws:

- Careless, unedited documents including awkward or inappropriate cutting and pasting of text
- Unsupported conclusions.

BAs often require the use of virtually uniform language or similar information between sections or between reports, tempting the author to cut language from one report and paste it into another. At a practical level, this activity may be unavoidable; however, great care must be taken when doing this to ensure that pasted text is appropriate for the new section or report. Reviewers frequently encounter text that has been inappropriately inserted into reports, rendering the report ineffective, if not unacceptable.

In addition, authors frequently state their conclusions without having provided the reviewer with enough information to understand how these conclusions were reached. These are often called leap-of-faith arguments, which again render the report unacceptable. If adequate support for conclusions is not provided, reviewers may not be able to concur with the analysis or the final effect determinations.

Other common flaws include the following, some of which are discussed in more detail in subsequent sections of this manual:

- Project activities are not described in enough detail to understand the potential impacts on listed species.
- A listed fish species is not addressed even though the project occurs within the boundaries of the evolutionarily significant unit (ESU) or distinct population segment (DPS).
- Species occurrence information is inconsistent or contradictory.
- Species are assumed to be absent because they are not documented in the Priority Habitats and Species Program (PHS) database (the "*not known to occur here"* flaw; see PART 2 chapters addressing effect determinations).
- Baseline conditions are insufficiently documented, particularly fish habitat.
- Critical habitat is not addressed or is incorrectly addressed.
- The action area is not defined or it is defined incorrectly.
- Specific best management practices (BMPs) to be implemented are not identified.

- Indirect and cumulative effects analyses are incorrectly addressed.
- Interrelated and interdependent activities are incorrectly addressed or incorrect terminology is used.
- Incorrect effect determination language is used for listed, proposed, and candidate species and critical habitat.
- Proposed actions that would occur away from the project site (e.g., dump sites, staging areas, and wetland mitigation sites) are not addressed.
- Impacts on habitat (e.g., alterations to vegetation or stream substrate, extraction or fill activities) are not quantified.
- Photographs do not document sensitive habitats (e.g., streams and wetlands) in the project area.
- Maps do not show waterways or vegetation removal (or planting) sites.
- The extent of in-water work is not clearly described.

1.2 Essential Attributes of a Successful Biological Assessment

The successful BA has three essential attributes:

- It provides adequate justification for an effect determination.
- It leads the reviewer through a discussion of project effects to a logical, well-supported conclusion.
- It contains adequate written description, figures, and graphics to portray the action and its effects on listed or proposed species.

The level of detail and impact analysis provided in a BA should be commensurate with the level of anticipated impacts. Significant impacts should elicit more detailed review and analysis. In addition, analysis of impacts should be related to the species being addressed in the BA.

1.3 Examples and Guidance for Biological Assessments

WSDOT's goal is to minimize these common errors in future BAs by providing guidance accompanied by writing samples to assist authors in identifying and correcting these mistakes in their own writing. The writing examples provided are excerpts from actual reports or generic examples providing example BA sections. In addition to the writing samples, PART 2 includes several guidance documents and forms generated by agencies and the Services.

The examples of BA sections appear throughout this manual as indented text in Arial font, followed by comments or guidance from NOAA Fisheries and USFWS (referred to here as *the Services*), indented in *Arial italic underlined* font.

PART 1

General Information for Biological Assessment Authors

Contents – Part 1

Tables

2.0 Understanding the Biological Assessment Process

2.0 Understanding the Biological Assessment Process

Chapter Summary

- Projects with a federal nexus require interagency coordination or Endangered Species Act evaluation.
- **Species lists** may be requested by letter as appropriate, or lists may be obtained online. BAs must be started within 90 days of receiving the species list and must be completed within 180 days of receiving the species list.
- **Biological assessments** analyze the potential effects of projects on listed species and critical habitat, and justify particular effect determinations. BAs are used as the technical basis for the consultation and conference processes.
- **Conferences** are required for federal actions likely to jeopardize the continued existence of *proposed* species or adversely modify *proposed* critical habitat.
    - Federal agencies may request a formal conference for a project warranting a conditional effect determination of LTAA.
    - The action agency also may request an informal conference for a project warranting a conditional effect determination of NLTAA.
- **Early consultations** are meetings with the Services prior to initiating consultation or conferencing, in order to discuss complicated projects during BA development and also to get feedback on preliminary effect determinations.
- Initiation of **informal consultation** must be requested in writing by the federal agency or the nonfederal designee of the federal agency. A BA or other similar documentation submitted with a cover letter serves as the consultation request. Informal consultation culminates in either a concurrence letter from the Services or initiation of formal consultation (in the event that the Services do not concur with effect determinations provided in the BA).
- Initiation of **formal consultation** must be requested in writing by the federal action agency. The request must include project information and analysis of the impacts potentially resulting from the proposed action. This analysis may be in the form of a BA, an EIS, or an EA. Formal consultation culminates in the issuance of a biological opinion by the Services.

- The WSDOT process consists of eight general phases:
  - Project development and assignment of project team
  - Information gathering
  - Pre-BA meeting
  - Project impact analysis
  - Write BA and internal review
  - WSDOT BA review to meet FHWA standards
  - Federal agency coordination and consultation
  - Project implementation.
- The WSDOT Highways and Local Programs (H&LP) process is slightly different than the general WSDOT process, in that local agencies typically develop the project BA (either in-house or using a consultant). H&LP coordinates and internal WSDOT Biology review prior to submitting the BAs to the Services.

2.1 General Information

Interagency coordination, as defined in Section 7 of the Endangered Species Act, requires all federal agencies to consult with the Services if a federal action agency determines that any action it funds, authorizes, or carries out may affect a listed species or designated critical habitat. Section 7 of the ESA applies to transportation projects, including local or state projects that have a federal nexus (i.e., have been funded, authorized, or carried out by a federal agency).

The following types of projects have a federal nexus and must ensure Section 7 interagency coordination:

- A U.S. Army Corps of Engineers permit (e.g., nationwide or individual permit) is required for the project.
- The project requires any another type of federal permit or approval.
- The project is fully or partially federally funded.
- The project is sited on federal land (e.g., Bureau of Land Management [BLM], Forest Service, national wildlife refuge, or military land).

2.1.1 Biological Assessments

A BA document is required for any major construction activity. This document analyzes the potential effects of the project on listed species and critical habitat and justifies a particular effect determination for each species and critical habitat addressed (described in PART 2, EFFECT DETERMINATION GUIDANCE). Major construction activity is defined in the ESA Section 7 regulations (50 CFR 402). All federal agencies are responsible for evaluating impacts on listed species resulting from all federal actions, regardless of scope. For listed species and designated critical habitat, this process of evaluation and federal review is termed *consultation*; however, for proposed species or critical habitats, this process is referred to as *conference*. Conferences and consultations are discussed more fully in the subsections below.

The U.S. Army Corps of Engineers uses the term *biological evaluation* (BE) for analyses that merit a *no-effect* (NE) or *not likely to adversely affect* (NLTAA) determination and require informal consultation. The Corps uses the term *biological assessment* (BA) for analyses that merit a *likely to adversely affect* (LTAA) determination. Despite the different meanings for these two terms, in practice the Corps refers to these two document types interchangeably.

2.1.2 Conferences

Conferences are required for federal actions likely to jeopardize the continued existence of proposed species or adversely modify proposed critical habitat. *Jeopardy* and *adverse modification* are defined in the ESA Section 7 regulations (see PART 3, GLOSSARY AND ABBREVIATIONS or in the statute itself, which is included on the reference compact disc accompanying this manual).

Federal agencies may request a formal conference for a project warranting a conditional effect determination of LTAA for proposed species or critical habitat. As discussed in PART 2 – EFFECT DETERMINATION LANGUAGE and EFFECT DETERMINATION GUIDANCE, an LTAA effect determination is not the same as jeopardy or adverse modification. Informal conferences also may be requested by the action agency if a listing is imminent and the project BA reaches a conditional effect determination of NLTAA for that species.

Action agencies can request a conference in the BA transmittal or consultation initiation letter for projects that address proposed species and critical habitats in the BA. A conference can also be requested for BAs that have already been submitted (or submitted and concurred on), before the project has been completed, when a species or critical habitat is proposed after BA submittal and is due to be listed or designated before project completion. This is considered a reinitiation. In this case a justification or effects analysis for the proposed species or critical habitat should be submitted instead of resubmitting the entire BA. Enough information should be provided to justify both the conference determination (*will not jeopardize the continued existence* or *will not destroy or adversely modify*) and the conditional ESA determination. Within the information submitted for reinitiation, the project biologist should reference the FWS number and/or the NOAA tracking number.

A conference opinion (for an LTAA project) is prepared by USFWS or NOAA Fisheries and can be adopted as the biological opinion when the species is listed or critical habitat is designated. Incidental *take* provisions in the conference opinion become effective at the time of listing or designation, along with terms and conditions. If a conference is requested for an NLTAA project, the conference report, by request of the action agency, can be turned into a concurrence letter at the time of listing or designation.

2.1.3 Early Consultations

Early consultations are optional and are used to reduce the likelihood that a proposed project will have significant impacts on listed species or critical habitat. Early consultation occurs prior to the filing of an application for a federal permit or license. See the PRE-BA MEETINGS section below to learn more about an early consultation process that is specific to WSDOT.

2.1.4 Informal and Formal Agency Consultation

The federal action agency may initiate either formal or informal consultation with the Services, depending upon the level of impact the project is expected to have upon listed species or designated habitats. Initiation of informal consultation must be requested in writing by the federal agency or the nonfederal designee of the federal agency. A BA or other similar documentation submitted with a cover letter serves as the consultation request. The request must include project information and an analysis of the impacts potentially resulting from the proposed project. The analysis may be in the form of an environmental impact statement (EIS), environmental assessment (EA), or BA.

Some action agencies may give nonfederal designee status to state or local agencies. The local agency may then complete informal consultations and conferences with the Services on behalf of the action agency. Nonfederal designees may not conduct formal consultations on behalf of the action agency, but they may prepare the BA used in the formal consultation. WSDOT serves as a nonfederal designee for both FHWA and the Corps.

2.1.4.1 Informal Consultation

Informal consultation can describe one of two processes:

- The process used to assist the Services in determining if formal or informal consultation is required for review of a project's potential impacts on listed species or designated critical habitat.
- The process through which federal agencies request Services concurrence with a determination of no effect or not likely to adversely affect. This process involves submittal of a BA to the Services for review.

If a federal agency determines (usually through preparing a BA) that a project is *not likely to adversely affect* listed species or critical habitat, the federal agency uses the informal consultation process to request Services concurrence. Concurrence by the Services is required for a *not likely to adversely affect* determination and is granted in a concurrence letter issued by the Services. Normally, projects that have *no effect* determinations will not send any documentation to the Services. However, on rare occasions a federal agency (or the designated nonfederal representative) may initiate informal consultation and request a concurrence letter on a no effect determination from the Services for large, potentially controversial projects.

2.1.4.2 Formal Consultation

If a federal action agency determines that its proposed project merits a determination of *likely to adversely affect* for a listed species, formal consultation and concurrence is required, in the form of a biological opinion from the appropriate Service(s). Initiation of formal consultation must be requested in writing by the federal action agency. The request must include project information and analysis of the impacts potentially resulting from the proposed action. This analysis may be in the form of a BA, EIS, or EA.

Through the consultation process, the Services may recommend modifications to projects to eliminate or reduce adverse effects. If effects can be reduced to an insignificant or discountable level, then consultation can proceed informally.

If formal consultation is required, the Services should be provided with an electronic version of the BA to assist in the preparation of a biological opinion. Formal consultation ends with the issuance of a biological opinion by the Services. The biological opinion can be a lengthy document and can take a substantial period of time to write. The document identifies whether or not the action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat. If the proposed action is not likely to jeopardize the continued existence of a species or adversely modify critical habitat, the project may proceed, provided it follows the terms and conditions outlined in the biological opinion. The biological opinion may include the following items:

- Reasonable and prudent alternatives (RPAs) or reasonable and prudent measures (RPMs) – RPA/RPMs include specific actions required to avoid *jeopardy* or *adverse modification* to critical habitat.
- Terms and conditions – These set out the specific methods by which the reasonable and prudent measures are to be accomplished.
- Prior to finalizing the biological opinion, the Services will provide draft terms and conditions to the federal action agency. The federal action agency, along with the project proponent, will review the conditions and provide comments back to the Services before they are finalized.

- Incidental *take* statement – A statement as outlined in Section 10(a) of the ESA that specifies the amount or extent of allowable taking (of listed species) and stipulates required reasonable and prudent alternatives, terms, and conditions.

- Conservation recommendations – These are voluntary measures the action agency can implement to further minimize adverse effects on listed, proposed, or candidate species.

- Reinitiation clause – A statement requiring that consultation be reinitiated if there are changes to the project or if new information (e.g., additional listings) requires that the project review be revisited.

2.1.5 Reinitiation of Consultation

Following completion of Section 7 consultation, reinitiation of a formal consultation is required under any of the following circumstances:

- When the amount or extent of incidental *take* is exceeded

- When new information reveals potential effects of the action on listed species or critical habitat in a manner or to an extent not previously considered

- When the action is modified in a manner causing effects on listed species or critical habitat not previously considered

- When a new species is listed or critical habitat is designated that may be affected by the action.

If one of these scenarios arises, the federal action agency is required to contact the Services and request that consultation be reinitiated. Because of this requirement, it is the responsibility of the federal action agency (and its representatives) to stay abreast of project activities throughout construction, remain aware of the current species and critical habitat listing status, and keep informed of the latest information regarding the interpretation of impacts on listed species and critical habitat.

Although the consultation process is completed with issuance of a letter of concurrence or a biological opinion, the action agency's ESA responsibilities must be diligently maintained until implementation or construction of a project is complete. Between the completion of consultation and initiation of the project, the status of species or critical habitat can change, as can the design or scope of the proposed project.

The action agency must ensure that the ESA approval received through consultation is still valid for all listed species and designated critical habitats before beginning construction of a project. To ensure this, action agencies should review the project description, design and scope, along

with species lists every 6 months to determine whether new species have been listed or critical habitats have been designated that were not addressed in the BA they submitted for consultation. Updated species lists can be obtained on NOAA Fisheries and USFWS websites:

- NOAA Fisheries (<http://www.nwr.noaa.gov/>)
- USFWS western Washington (<http://westernwashington.fws.gov/se/splisttableMar05.pdf>)
- USFWS eastern Washington (<http://easternwashington.fws.gov/Images/UCFWO%20listed-candidate%20spp.doc>). Eastern Washington species lists can also be requested directly from the USFWS field office.

Following are some common questions, with answers.

What if consultation has been completed and a new species is listed that was not addressed in the original consultation but could occur in the action area, or new critical habitat is designated, prior to or during construction of a project?

Consultation should be reinitiated to address these new species and critical habitats.

What if consultation has been completed and an emergency listing of a species is made (the species could occur in the action area of the project but was not addressed in the original consultation) prior to or during construction of a project?

Consultation should be reinitiated to address this new species.

What if consultation has been completed and a new species that was not addressed in the original consultation but could occur in the action area is proposed for listing, or new critical habitat is proposed for designation, prior to or during construction of a project?

A conference should be requested with the Services to address these new proposed species and critical habitats. This is considered a reinitiation.

What if a conference for proposed species or critical habitat has been completed and the species is listed or the critical habitat is designated prior to or during construction of a project?

If a proposed species is listed or proposed critical habitat is designated prior to or during construction of the project, the action agency can formally request that the previously completed conference opinion be converted to the biological opinion

for the project. With this single request, the action agency fulfills its consultation obligations with the Services and receives take coverage for its project.

What if a project design or scope changes so that the proposed action no longer matches the project description included in the BA submitted for consultation?

The action agency should reanalyze the potential new impacts associated with the revised project, and consultation should be reinitiated to address this new information.

2.2 WSDOT Consultation Process

The WSDOT process can be divided into eight general phases:

- Project development and assignment of project team
- Information gathering
- Pre-BA meeting
- Project impact analysis
- Write BA and internal review
- WSDOT BA review to meet FHWA standards
- Federal agency coordination and consultation
- Project implementation.

2.2.1 Project development and assignment of project team

Once a project need has been identified, WSDOT or the lead agency will compile a team of project engineers, environmental permit coordinators and designers to develop the project. This internal team will begin generating project concepts and designs and identifying the environmental permitting issues pertaining to the project. Generally, once the project team has 30-percent designs complete, the environmental permitting process, including ESA consultation, begins. The environmental permitting process may begin earlier or later in the project design process depending upon the specific project.

Ideally, a project biologist will be assigned to the project team early on in the design process to provide input to the design process. The project biologist can work with project designers and engineers to identify species of concern in the vicinity of the project, whether surveys for wildlife or plants will be required, in-water work windows, timing restrictions based on wildlife sensitive periods, and other environmental considerations and issues of special concern.

2.2.1.1 Assignment of project biologist

To begin the ESA consultation process, the project team contacts the WSDOT regional environmental office to determine the level of ESA review that may be required. The environmental office will assign a biologist to the project. This may be the WSDOT regional biologist, a consultant biologist, or a biologist from ESO in Olympia. Assignment will depend on the project and the workload. The following subsection outlines considerations for working as part of the WSDOT team.

2.2.1.2 Working as Part of the WSDOT Team

In order to implement its extensive highway construction program, WSDOT often contracts consultant biologists to help complete the ESA Section 7 analysis. These biologists may be contracted directly by WSDOT to work on WSDOT projects, or indirectly by Local Agencies to work on projects funded by WSDOT's Highways and Local Programs division.

For most of WSDOT's projects, FHWA serves as the federal nexus. If federal funding is lacking, often a federal permit, usually from the U.S. Army Corps of Engineers (Corps), will be required, resulting in the Corps serving as the federal nexus. Occasionally a project involves more than one federal agency because it occurs on federally owned lands (Forest Service, Bureau of Land Management, etc.), which can result in joint lead agencies for a given project. For all informal FHWA and Corps consultations, WSDOT serves as the federal action agencies' non-federal designee and completes ESA Section 7 consultations with the Services on their behalf.

Though consultant biologists are hired based upon their individual qualifications and expertise, the biological assessments they are contracted to produce are agency documents that must be consistent with both WSDOT and FHWA policies and practices. To this end, consultants preparing biological assessments on behalf of these agencies should think of themselves as **part of the WSDOT project delivery team**, striving to produce documents that are internally consistent, that accurately reflect agency policies, practices and publication styles, and that have been fully coordinated with other team members.

Some basic steps for consultants to ensure the documents they produce reflect WSDOT standards are provided below:

- Coordinate early and often with the WSDOT project manager.
  - An initial meeting, preferably in the field, with the WSDOT project manager and relevant project team members should be organized to review the project.
  - WSDOT project managers review biological assessments for consistency with the agency's policies, practices, and the proposed project description.

- Coordinate early and often with the WSDOT project engineer.
  - WSDOT project engineers review biological assessments for consistency with the agency's policies, practices, and the proposed project description.
- Recognize that it is WSDOT's responsibility to define the action upon which it wishes to consult.
- It is the consultant's responsibility to assess the impacts associated with the action as defined by WSDOT.
  - Do not revise the project description, change the project timeline, add project elements, introduce mitigation requirements, suggest design changes, etc. without coordinating with the project manager.
  - Do not coordinate directly with the resource agencies (NOAA Fisheries and USFWS). Always contact the project manager and WSDOT regional environmental staff for assistance.
  - Do not add minimization measures, BMPs or design changes to the project without coordinating with the project engineer.
- Coordinate early and often with the WSDOT regional biologist.
  - WSDOT regional biologists review biological assessments for consistency with agency policies and practices and also for document quality standards (see PART 1- WSDOT BA REVIEW TO ENSURE FHWA STANDARDS).
- As the action agency, it is the responsibility of WSDOT, acting on behalf of FHWA, to provide an effect determination for each listed or proposed species or designated critical habitat potentially affected by a project. The consulting biologist provides a tentative effect determination for their approval.
- It is the consultant's responsibility to coordinate the effect determinations contained in a biological assessment with the WSDOT regional biologist to ensure the analysis and conclusions of the BA are consistent with other projects in the region and with current agency policies.
- It is the consultant's responsibility coordinate early and often with the internal or external project team producing the biological assessment and or NEPA/SEPA discipline reports, to ensure clarity and internal consistency in the document (style, logic, analytical approach, terminology, etc.).

- It is the senior biologist's responsibility to ensure the BA analysis and conclusions of the report are consistent with WSDOT standards.
- Biological assessments that are not consistent with agency policies and practices and do not meet WSDOT's quality standards for biological assessments, will be considered deficient and referred to WSDOT Headquarters' Environmental Services Office for secondary review (see PART 1- WSDOT BA REVIEW TO ENSURE FHWA STANDARDS).

2.2.2 Information Gathering Phase

The information-gathering phase is divided into two tasks:

- Species related information gathering
- Project related information gathering.

2.2.2.1 Species Related Information Gathering

The information gathering process for species is divided into three steps:

- Species list acquisitions (USFWS, NOAA Fisheries)
- State database requests (Washington Department of Fish and Wildlife [WDFW], Washington Department of Natural Resources [WDNR])
- Personal communication with local experts (e.g., tribes, WDFW).

Species List Acquisitions

The project biologist must have a species list to prepare a biological assessment. Species lists identify listed species, proposed species, candidate species, species of concern, and proposed and designated critical habitat in defined geographic areas.

The project biologist should begin researching the species that may potentially occur in the project action area by obtaining species lists from USFWS and NOAA Fisheries websites. BAs must address the listed and proposed species and designated and proposed critical habitat identified on species lists obtained from the Services within 180 calendar days of acquiring species lists from the Services.

For projects located in western Washington, the USFWS provides countywide species lists online at <http://www.fws.gov/westwafwo/se/SE_List/endangered_Species.asp>. Similarly, for projects located in eastern Washington, countywide lists are also available online at <http://www.fws.gov/easternwashington/county%20species%20lists.htm>. Because they are not specific to the project area, these countywide lists often include species that do not occur in or near the action area.

To generate a project-specific USFWS species list, the project biologist should request species and habitat information from the WDFW Priority Habitats and Species database and the WDNR Natural Heritage database (described more fully below) for the project site and vicinity. This information can be used to narrow the countywide list provided by USFWS, to better represent the species that could occur in the vicinity of a proposed project. A project biologist can also revisit Federal Register listing decisions to determine the historical and current range for various species and to evaluate whether these ranges coincide with the project area. In Western Washington, if a species list is needed to address a different size area (the project area or a city, for example), the action agency may choose to generate its own list to send to the Services for concurrence.

NOAA Fisheries species lists relevant for Washington state salmonids can be obtained online at <http://www.nwr.noaa.gov/ESA-Salmon-Listings/Index.cfm>. Information on additional species under the jurisdiction of NOAA can also be obtained online at <http://www.nmfs.noaa.gov/pr/species/>.

The project biologist can generate a site-specific NOAA Fisheries species list by using the NOAA species lists, coupled with information from WDFW, to compile a more specific list of species occurring in the vicinity of a proposed project. The site-specific list generated by the project biologist can be verified with a NOAA Fisheries biologist to ensure the list's accuracy and applicability to the proposed project site.

The BA must be started within 90 days of receiving the species list and must be completed within 180 days of receiving the species list, and must be completed prior to the initiation of construction or contracts. Because the status of species and habitat can change, species lists must be updated every 6 months. Potential impacts on these species should be evaluated in a BA.

The ESA requires all listed species potentially affected by a project to be addressed in the BA written for a project, including any listed species inadvertently omitted from the species list. USFWS and NOAA Fisheries species lists may not always be exhaustive due to constant changes in the local presence of species and because the lists may be generated on a countywide or statewide scale. As a result, these lists may include species that might not occur in the project area, or they may omit species that are, in fact, present in the project vicinity. For these reasons it is recommended that project biologists supplement federal species lists with information from other state and local agencies and biologists.

State Database Requests

The following agencies manage databases for priority animal species and habitats as well as for sensitive plant species and habitats:

- WDFW—Priority Habitats and Species Program database (PHS database) for information on ESA-listed fish and wildlife species, state priority species, and any habitat associated with these species occurring in the

vicinity of the project (data can be requested at <http://wdfw.wa.gov/hab/release.htm>).

- Marbled murrelet and spotted owl information must be requested specifically from the PHS database, in addition to a general request.
- All specific site information is sensitive and confidential and generally should not be included in public documents or the final BA.
- For batched or programmatic BAs that cover a large geographic area, species information can be included in the BA. However, all sensitive information must be shown at a coarse scale. WDFW outlines standards and criteria for exhibiting species information.

- WDNR—Natural Heritage Program database for information on locations of sensitive plant species and rare plant communities occurring in the vicinity of the project (data can be requested at <http://www.dnr.wa.gov/base/publications.html>).
  - All specific site information is sensitive and confidential and should not be included in public documents or the final BA.

See PART 3, INFORMATION REQUEST CONTACTS AND LETTER SAMPLES, for more information.

Personal Communication with Local Experts

Personal communication with local experts is highly recommended to acquire additional information on species occurrence and environmental baseline conditions in the watershed or project area. Citations for these communications should include the date and the names and available contact information for the local biologists interviewed by the project biologist. Citations should be provided throughout the document as necessary and included in the reference section of the BA. A range of potential resources is available:

- Local tribal biologists
- WDFW area habitat biologists
- WDNR biologists
- Watershed council members
- Researchers from local universities or academic institutions.

A list of WDFW regional habitat program managers is provided in PART 3, INFORMATION REQUEST CONTACTS AND LETTER SAMPLES.

2.2.2.2 Project Related Information Gathering

When gathering information related specifically to the proposed action, the project biologist must complete two steps:

- Develop an understanding of the proposed action, which involves breaking down the proposed action into its various elements.
- Conduct a site visit.

Develop an Understanding of the Proposed Action

The first step in understanding the proposed action, and also in characterizing the action in the BA, is deconstructing the proposed action into its constituent elements or parts. To do this, the project biologist must review project plans and consult with project engineers, environmental staff and designers to identify all elements of the project.

The project biologist must then develop an understanding of how the various elements fit together and what potential impacts could be generated from them. Again, close coordination with project engineers, environmental permit coordinators and designers will be necessary to ensure the project biologist understands the timing, sequencing, and magnitude of the project elements. The following project conditions should be identified during this phase:

- Project timing and chronology
- Amount and location of clearing and grading
- Amount of new impervious surface
- Proposed treatment of runoff
- Existing impervious surface, treatment, and location of treatment facilities
- Extent of in-water work
- Duration of in-water work
- Amount and type of vegetation to be removed (this may require a site visit)
- Type of equipment to be used
- Locations of material sources that are being developed due solely to the project
- Proposed BMPs
- Extent of the operation of the facility
- Future maintenance requirements.

If a project will create new impervious surface, the project biologist can ask project personnel for the Endangered Species Act Stormwater Design and Erosion Control Checklist (see PART 3, GATHERING INFORMATION FOR A BIOLOGICAL ASSESSMENT) to facilitate gathering all necessary information.

To complete this task and to facilitate the ESA analyses of project impacts, the project biologist should draft a detailed project description for review by the project team. An accurate project description is essential for completing the subsequent ESA analysis and documentation tasks.

Conduct a Site Visit

After developing an understanding of the project elements, the project biologist must conduct a site visit to document existing conditions and to review the proposed action. WSDOT policy requires that the project engineer, project environmental permit coordinator, or other person who is intimately familiar with the project accompany the project biologist on the site visit, particularly for complex projects. During this information-gathering phase, the project biologist should determine and document the following conditions:

- Vegetation
- Topography (immediate and vicinity)
- Stream habitat conditions (water quality, habitat types and features present, site-specific description of habitat characteristics and channel configuration, etc.)
- Riparian conditions (vegetation, large woody debris [LWD], bank condition, watershed conditions, etc.)
- Existing level of disturbance and/or development
- Historical and present land use
- Historical and present species use
- The presence of critical habitat within project area, vicinity, and action area.
- The presence of suitable habitat within project area, vicinity, and action area.

When in the field, the project biologist should also note the following features:

- What are the locations of significant habitat features (important to species survival or reproductive success) in relation to project? Are they active or inactive? Are they in the line of sight? Will they potentially be affected

by construction-related noise? Will they potentially be affected by construction-related sediment impacts?

- Are prey species located in the habitat? Will they be affected by project-related impacts? Will the impacts be great enough to cause an indirect effect on listed species?
- For some species (e.g., murrelet and bull trout), if suitable habitat features or prey species are present in a project action area, the presence of listed species must be assumed.
- Is a survey (according to accepted protocol) necessary to identify the presence of suitable habitat or potential presence of species?

The evaluation of the extent of proposed impacts related to the project action will be based on the project, species, and habitat information gathered in the two steps of the information gathering phase.

2.2.3 Pre-BA Meeting

As part of its efforts to manage or expedite the consultation process WSDOT established a monthly meeting with the Services (NOAA Fisheries and USFWS) where projects can be presented and discussed. These meetings are held in Lacey, and are attended by representatives from USFWS, NOAA Fisheries, WSDOT and FHWA. For any given project, both project design staff and environmental staff, including the project biologist, should be present. At these meetings, project designs and impact analyses are presented and methods to reduce impacts to listed species are discussed with the Services. Projects should attend a meeting prior to submittal of the project BA to the Services. Large complicated projects may be presented at more than one meeting. The Pre-BA Meeting process is outlined in detail below, based on January 6, 2006 guidance.

Representatives of Washington State Department of Transportation (WSDOT), Federal Highways Administration (FHWA), U.S. Fish and Wildlife Service (USFWS), and National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) attend the Pre-BA meetings. The purpose of the Pre-BA meetings is to allow early involvement of the project proponents and the Services to discuss projects prior to their submittal for Section 7 consultations under the Endangered Species Act (ESA). Project managers, especially those with very complex, multi-year projects may attend very early in the design phase, and then may attend several meetings as the project progresses, while others may only need to attend one time. During the meeting, the project proponent will have an opportunity to explain the project design and the project's limitations, and the Services will have an opportunity to discuss how the project could avoid and minimize its effect on listed species. If practical, project proponents should attend at such a time as there is still flexibility in project design.

The Pre-BA meetings are held monthly at a pre set day and time, which is currently the third Thursday of the month. The meeting day can be changed by the request of any of the participating agencies. These requests should be made as far in advance as possible. When a participating agency representative cannot attend a regularly scheduled meeting, he/she will coordinate with the other three agencies to find a mutually agreeable date, time, and location. Meetings are canceled when there are no projects to present (this can happen during busy summer construction season). Most meetings are about 3 hours long.

Ten days prior to the meeting, a call for agenda items is sent out to all region environmental coordinators, project engineers, Highways and Local Programs personnel, WSDOT headquarter and regional personnel, FHWA and the Services. Projects that would like to attend the meeting must submit a one page project summary (template will be provided to consultant biologist by WSDOT project manager or regional biologist). They must also provide the project representatives name, email and phone number to allow for last minute schedule changes if necessary due to inclement weather or emergencies.

In addition to contact information on the presenter, the project summary sheet must include a short description of the project including methods to reduce impacts, a list of the listed species in the action area, the provisional effect determination for each species, and the rational for each effect determination. A vicinity map and aerial photo must also be attached. This document must be brief and the photos must be formatted to insure that the document can be emailed out. The project summary sheets for all attending projects are attached to the meeting agenda that is sent out 3 days before the meeting to allow the Services and FHWA to become familiar with the projects prior to the meeting. FHWA Area Engineers and Team Leaders who have projects from their area being presented will know if they need to attend the meeting or not. The project summary form will provide a record of the presented projects and their ESA issues. Projects which do not provide the project summary sheet in time to go out with the agenda will be scheduled for the next monthly meeting.

The agenda will list the order in which the projects will be presented. Every attempt is made to schedule projects with consideration to distances traveled. Both environmental and engineering staff should be present for the project discussion. Local agency projects must have a representative from the local agency present during the discussion. Projects that are scheduled later in the agenda are asked to arrive 15 minutes early in case previous projects finish ahead of schedule. Presenters must insure that they can complete their presentation and discuss all their issues in the time allowed. This will require that they focus the project discussion on elements that may affect listed species. Times may range from 30 to 60 minutes depending on the number of projects presenting and the complexity of the project. If a project needs more time, the meeting facilitator will strive to modify the agenda accordingly. If a project decides that they cannot make the scheduled meeting, they are required to call the meeting facilitator to cancel. Attempts will then be made to rearrange the scheduled to avoid 30 to 60-minute gaps in the meeting.

When possible, WSDOT will provide a meeting facilitator to insure that the agenda is adhered to and discussions focus on project-specific issues relevant to the Endangered Species Act. If a

note taker is available they will record for each project the major issues, suggested minimization measures, and commitments made by each agency. If a note taker is not available, each project will be responsible for taking notes and sending them to the meeting facilitator within 48 hours of the meeting. WSDOT's meeting facilitator will then send out one email to all the meeting participates containing all of the meeting notes. This email will serve as a record of the meeting.

The following projects are required to attend a Pre-BA meeting (although all projects with potential impacts to listed species would be allowed to attend):

1. All formals, although WSDOT formal consultations with only a Corps nexus should also present their project at the monthly Corps meeting.

2. All projects that complete in water work in waters where listed fish or Orcas may be present.

3. All projects that involve in-water pile driving in listed fish bearing waters, including Puget Sound.

4. All projects which conduct blasting within one mile of a point location for bald eagle, northern spotted owl site center, or occupied or suitable marbled murrelet habitat, or within 1/4 mile of a listed fish bearing water.

5. All projects (that are not conducting blasting) which occur within suitable habitat or within 60 yards of suitable habitat for spotted owls and marbled murrelets during their respective nesting seasons.

6. All projects, which occur within designated or proposed critical habitat for any plant or animal species and which have the potential to alter the habitat. Projects that do not modify or degrade the critical habitat may not need to attend.

7. Projects that complete activities within ¼ mile if not in line of sight or ½ mile if in line of sight of a bald eagle nest during the nesting season (January 1 – August 15) or winter roost or wintering concentration area during October 31 – March 31.

Obviously, not all projects meet one of these criteria so there will be projects that are consulted on that have not attended a Pre-BA meeting.

Projects that should not come to the Pre-BA meeting include:

1. Projects that are a no effect for species under the jurisdiction of both NOAA and USFWS.

2. Projects in Eastern Washington that fit under both PBAs.

3. Projects in Eastern Washington that fit under the PBA for one Service and are a NE for the other.

4. H&LP projects that use the ECS form to document their no effect determination.

If there are any doubts if a project should attend or not, please contact the meeting facilitator to discuss if it should be presented or not. In the future, a single point person may be established in each region or mode to facilitate the presentation preparation.

Each region and mode will be responsible for screening their own projects and insuring that they attend the Pre-BA meeting as required prior to submitting the BA to the Services. The Headquarters HLP environmental staff with assistance from the WSDOT biologist who reviews the draft BA, will screen local agency projects to determine which projects must attend the pre BA meeting.

While attendance at Pre-BA meetings is mandatory for all projects that meet the above requirements, Eastern Washington Regions may be able to replace their presentation at a Pre-BA meeting with an acceptable alternative meeting format.

2.2.4 Project Impact Analysis Phase

The project biologist should systematically evaluate the impacts of a proposed project upon species and habitats. The impact analysis phase is divided into two tasks:

- Environmental Impact Analysis to Determine Project Action Area
- Analysis of Project Impacts to Species and Critical Habitats.

2.2.4.1 Environmental Impact Analysis to Determine Project Action Area

First an analysis of chemical, physical, and biological effects of the project on the environment is completed to determine the geographic extent of the project action area. The following topics are analyzed in this first project impact analysis task:

- Direct effects
- Indirect effects
- Interrelated actions or activities
- Interdependent actions or activities.

These topics are discussed more fully in CHAPTER 3, COMPONENTS OF A BIOLOGICAL ASSESSMENT.

Based upon the results of this analysis of all project related effects, the project biologist defines the action area for the proposed project. The action area in turn, defines the scope of the analysis of project impacts to species and critical habitats discussed below.

Impacts of the project can potentially be reduced by incorporating impact minimization measures (MMs), best management practices (BMPs) or performance measures (PMs) into project designs. The project biologist should coordinate with the project team to identify acceptable minimization measures that can be incorporated into project designs and considered in the environmental impact analysis. If new minimization measures are incorporated into the project design, it is essential that the project description is updated to reflect any changes to the project design or proposed construction of project elements.

For projects that require formal consultations due to an adverse effect determination, the BA must address cumulative effects. However, impacts associated with cumulative effects do not influence the effect determination of the project on listed species or critical habitat.

2.2.4.2 Analysis of Project Impacts to Species and Critical Habitats

In the second task, the project biologist should systematically evaluate the impacts of a proposed project upon species and habitats occurring within the project action area. One way of thinking about the analysis is to first look at the potential for the species to be exposed to an action, and then to determine what the response of the species could be to that action (i.e., exposure – response analysis).

The exposure part of the analysis should identify whether or not listed species or designated critical habitat will "co-occur" with the effects of the activities under consultation and should characterize the magnitude and spatial and temporal patterns of exposure to species or critical habitats. To determine the potential for exposure of listed species to project-related impacts, the project biologist should consider the characteristics of each anticipated project impact (where, when, length of time, frequency, etc.), environmental baseline conditions, and how the timing of or use by a species in the action area could coincide with anticipated impacts resulting in potential exposure. To determine potential for critical habitats to be exposed to project impacts, the project biologist must examine whether project impacts will extend into critical habitat areas and/or will affect any primary constituent element of these habitat areas.

If exposure is likely, the project biologist would complete a response analysis. Response analyses determine how listed resources are likely to respond after being exposed to project-related effects. First identify general responses of species and habitats to anticipated project impacts. Then consider how specific project impacts would be modified by proposed MMs and how in turn they would affect anticipated species' and habitats' responses to project impacts. Given the potential for exposure and the influence of BMPs and minimization measures on anticipated project-related effects, the project biologist would characterize the anticipated response of each species or critical habitat attribute associated with each project-related impact.

To make an effect determination that pertains to the project as a whole, these project-element specific impact analyses would be considered in concert for each listed species or designated critical habitat. One of three effect determinations can be made: *No effect*; *May affect, Not likely to adversely affect*; and *May affect, Likely to adversely affect*.

2.2.5 Write BA and Internal Review

The project biologist documents their analysis and conclusions in one of the following documents: No Effect Letter, Biological Assessment/Biological Evaluation, or Programmatic Biological Assessment Form (WSDOT internal use only). For information on No Effect Letters and Biological Assessments, see PART 3, SUBMITTING A NO EFFECT LETTER OR BIOLOGICAL ASSESSMENT.

Before finishing the draft ESA document, the project biologist should coordinate with the project team, to verify appropriate MMs and BMPs have been included in the document. Prior to submitting the document to WSDOT environmental staff for review, the completed draft document should undergo a rigorous internal review to ensure that the document meets WSDOT standards. Once this internal review has been completed, and appropriate revisions have been made, the revised document should be provided to WSDOT for review.

2.2.6 WSDOT BA Review to Ensure FHWA Standards

Before submitting BAs to the Services (NOAA Fisheries and USFWS) for formal or informal consultation, WSDOT completes an internal sufficiency review of BAs that have been prepared by consultant biologists to ensure that the BAs meet FHWA standards. Completed BAs will be submitted by consultants (Senior authors) to the appropriate WSDOT regional staff for review. WSDOT reviewers use the BA review checklists to determine whether the documents are complete and compliant with WSDOT policies and guidance. These checklists are provided in PART 3, SUBMITTING A NO-EFFECT LETTER OR BIOLOGICAL ASSESSMENT. If a document is considered complete, it is forwarded to the Services for consultation. If necessary, the BA will be sent back for correction. BAs can be returned for two reasons: 1) for changes in project description or setting or timing etc., and 2) for deficiencies in meeting WSDOT quality standards and policies, such as incorrectly identifying the action area, incorrectly calculating the extent of project-related noise, or for an overall inconsistent BA.

BAs that have been identified as having policy or quality deficiencies will be referred to WSDOT headquarters, Environmental Services Office, for secondary review. If, after this second review, there is agreement that the BA does not meet WSDOT policies and quality standards, the consultant biologist will be given a warning, notified of deficiencies, and asked to correct the BA. After the submittal of two policy or quality deficient BAs, the biologist will be removed from the roster of qualified Senior and Junior authors and must retake the two-day BA qualification course and pass the qualification exam again prior to submitting any other BAs.

2.2.7 Federal Agency Coordination and Consultation Phase

To ensure compliance under Section 7 of the ESA, formal or informal consultation with the Services may be initiated by a federal action agency or by a non-federal designee (for informal consultation only). As is discussed in detail above, the level of impact a project is expected to have on listed species or designated habitats, and therefore the type of effect determination that is anticipated, determines the level of consultation necessary (see Table 2-1). The four types of effect determinations are discussed briefly in PART 1, EFFECTS OF PROJECT ON SPECIES AND CRITICAL HABITATS, and more extensively in PART 2, EFFECT DETERMINATION GUIDANCE.

Table 2-1. Type of effect and level of consultation.

Type of Effect	Abbreviation	Level of Consultation
No effect	NE	Not needed or informal
May affect, not likely to adversely affect	NLTAA	Informal
May affect, likely to adversely affect	LTAA	Formal
May have a beneficial effect	None	Informal or formal

If a project will have *no effect* (NE) on listed species or designated critical habitats, consultation is not necessary. Concurrence from the Services is not required or normally obtained, but may be requested for project documentation files.

If a project *may affect* listed species or designated critical habitats, consultation with the Services is required, whether these effects are beneficial or adverse. If it is determined that a project *may affect but is not likely to adversely affect* (NLTAA) listed species or designated habitats, informal consultation is initiated. An effect determination of NLTAA assumes that project-related impacts will be insignificant or discountable. WSDOT submits BAs to the Services for informal consultation once they have been approved by WSDOT.

If it is determined that a project *may affect and will provide a beneficial effect* on listed species and designated critical habitats, informal consultation is permitted, but only if there will be no short- or long-term adverse effects. For example, if there will be short-term adverse effects and long-term beneficial effects, formal consultation is required. If it is determined that a project *may affect and is likely to adversely affect* (LTAA) listed species and designated critical habitats, formal consultation is initiated. For formal consultations, the BA is provided to FHWA by WSDOT. The BA is reviewed by the FHWA Area Engineer and Program Delivery Team Leader as needed and any outstanding project issues are resolved with WSDOT. The BA is submitted to the Services for formal consultation by the FHWA Area Engineer.

Once BAs have been submitted to the Services for review, the documents are reviewed by the Services to determine if clarification of information is necessary to complete consultation. This initial review is completed as soon as possible, but less than 30 days after receipt of the biological assessment and request for consultation. For formal consultations, during this initial

review, the Services will also determine whether they agree with the effect determination provided by the action agency.

If additional information or clarification is necessary, coordination between the involved agencies will occur. This may entail meetings, field reviews, or posing and responding to questions in person, via letter, or email. If additional information is requested, WSDOT attempts to return the additional information to the Services within two weeks of receiving the request. Project biologists may be tasked with providing this additional information and should be aware of this two-week timeframe. Responses to information requests for informal consultations will be completed by or coordinated with project biologists by the WSDOT project manager or the WSDOT regional, modal (Washington State Ferries, or WSDOT Rail Office), or Highways and Local Programs biologist. Information requests for formal consultations will be completed by or coordinated with the project biologist by the FHWA Area Engineer and/or Program Delivery Team Leader.

The Services will provide WSDOT and FHWA project staff with their draft incidental take statements, terms and conditions, and reasonable and prudent measures for review. FHWA and WSDOT will prepare a collective response to these draft documents and analyses within two weeks of receiving them from the Services (or within a mutually agreed upon timeframe). Once these conditions have been mutually agreed upon and any disputes resolved, the Services' consultation documentation can be completed.

For informal consultation, a letter of concurrence or a letter of non-concurrence is issued to conclude consultation. For formal consultation, issuance of a biological opinion concludes consultation.

2.2.8 Project Implementation Phase

During project implementation, any impact minimization measures included in the BA must be followed.

In some cases, during the time period between receiving concurrence from the Services and completion of the project, a change in conditions may require reanalysis and may result in stopping construction. For example, there may be a change in the status of a species or critical habitat, resulting in a higher level of protection (e.g., a species undergoes an emergency listing). Or there may be a change in scope or design of the proposed project after construction has begun. Changes of this nature may require construction to be stopped while potential project impacts are reassessed and the consultation process is reinitiated.

2.3 Highways and Local Programs Process

Highways and Local Programs is a section of WSDOT that distributes Federal Highways Administration funding primarily to local agencies for transportation-related projects. The use of

FHWA funding provides a federal nexus trigger that subjects the local agency project to the same requirements outlined above. However, the WSDOT H&LP process is slightly different, in that the local agency typically develops the project BA (either in-house or using a consultant). H&LP coordinates with the Environmental Services prior to submitting the BAs to the Services.

- In BAs prepared by local agencies, the federal nexus for a project (FHWA) or the lead agency (if more than one federal agency is involved) should be clearly identified.
- If a project involves more than one federal agency (e.g., a FHWA-nexus project that takes place within Forest Service lands), all of the federal agencies should review the BA.
- Local agencies and their consultant should follow the guidance outlined within this manual. BAs should be developed in a manner that addresses the sections and issues outlined in this training document, to the extent that they are applicable.

For *no effect* and *not likely to adversely affect* BAs, H&LP, in coordination with ESO's Biology Program, and FHWA are obligated to review the determination provided by the local agency for adequacy and concur with the determination. The process is as follows:

- The local agency forwards a copy of the completed BA and/or ECS form to the Region H&LP office. (Part 5 of the ECS checklist may be used to document a no effect determination, depending on the nature of the project and location. If the project requires additional justification to support a NE determination, a stand alone NE document is necessary.)
- The Region H&LP office forwards the document to the Headquarters H&LP for WSDOT Biology review. If additional information is requested by H&LP, the BA is revised and resubmitted for final approval on behalf of FHWA.
- Upon completion of the WSDOT review and approval of the document, a copy of the signed ECS form and the BA are submitted to FHWA, if the determination is a no effect. If the determination is a *may affect, not likely to adversely affect*, the BA is forwarded (on behalf of FHWA) to the Services to initiate informal consultation.

For *likely to adversely affect* BAs, or when the Services do not concur with a BA finding of *not likely to adversely affect*, the following process is utilized:

- After FHWA concurs with the effect determination presented in the BA, the report is forwarded to the Services with a request to initiate formal consultation.

- Formal consultation occurs between the Services, H&LP, the local agency, and FHWA.
- If formal consultation is initiated, FHWA cannot approve environmental documentation, federal right-of-way acquisition, or construction until the completion of formal consultation.

Under the National Environmental Policy Act (NEPA), coordination with NOAA Fisheries and the U.S. Fish and Wildlife Service must occur prior to FHWA approval of the project.

3.0 Components of a Biological Assessment

3.0 Components of a Biological Assessment

Chapter Summary

The BA consists of the following main parts or sections, each of which is discussed in detail in this chapter. WSDOT has developed a form (provided on the compact disc accompanying this manual) that includes these BA elements:

- Executive summary
- Introduction
  - Project location
  - Project description
- Project vicinity
  - Project setting and land use
  - Watershed
  - Wetlands
  - Geography and soils
  - Vegetation
- Effects of project on environment
  - Direct effects
  - Indirect effects
  - Effects of interrelated and interdependent actions
  - Cumulative effects
- Impact avoidance and minimization measures
- Project action area
- Species list
- Environmental baseline within the project action area
  - Terrestrial species
  - Freshwater Aquatic species
  - Marine Aquatic Species

- Occurrence of federally listed and proposed species in project action area
  - Terrestrial species
  - Aquatic species
- Effects of project on species and critical habitats
  - Direct effects
  - Indirect effects
  - Effects of interrelated and interdependent actions
  - Compliance with existing recovery plans
  - Take/jeopardy/adverse modification analyses
- Effect determinations
  - Listed species
  - Proposed species
- References
- Appendices
  - WSDOT fish removal protocols and standards
  - Species lists from USFWS and NOAA Fisheries
  - Biology of listed species
  - Candidate species information
    - Occurrence of candidate species in project action area
    - Effects analysis (candidate species)
    - Effect determinations (candidate species)
  - Essential fish habitat assessment
  - Environmental baseline for aquatic habitats.

The Endangered Species Act requires preparation of a BA for any major construction project with a federal nexus. The purpose of a BA is to evaluate the potential effects of a proposed project on listed and proposed wildlife, fish, and plant species and designated or proposed critical habitats that are likely to occur in the vicinity of the project. To ensure compliance with the ESA, some agencies, including WSDOT, prepare BAs for projects that would not be considered major construction.

The BA should use the "best available scientific and commercial information" (USFWS, NOAA Fisheries 1998). This information is used to help analyze project impacts and is the basis for the

effect determination. This information must have been evaluated by the Services and found to be acceptable. For example:

- Attachment B of the peregrine document (USFWS 1999) identifies key information sources for species under USFWS jurisdictions and other pertinent literature.
- Appendix A of the NOAA Fisheries matrix document (NOAA Fisheries 1996) identifies key habitat elements and activities that affect them and also provides references for species under NOAA Fisheries jurisdiction (see the compact disc accompanying this manual).

Project biologists may contact the Services for additional species-specific information, including contact information for local area habitat biologists or academic experts. A list of useful standard references is also provided in PART 3, STANDARD REFERENCES USED IN THE PREPARATION OF BAS.

Using the WSDOT biological assessment form, the biological assessment review checklist, or the no-effect letter checklist (see PART 3 or the compact disc accompanying this manual) can help to ensure that all necessary topics are addressed in a no-effect letter or a BA. The content of each BA section is summarized in Table 3-1.

Table 3-1. Example of biological assessment format.

Section Heading	Contents of Section and Subheadings	Notes
Executive Summary or Summary	One to two-page summary of project location, proposed action, listed species and critical habitat evaluated, project effects on species and habitat, minimization measures (MMs), effect determinations, and hydrologic unit code (HUC) for the project site watershed	Keep it brief and concise.
Table of Contents		Make sure page references are correct.
List of Tables		Make sure page references are correct.
List of Figures		Make sure page references are correct.
Introduction	▪ Project proponent ▪ Federal nexus ▪ Project purpose/need/history ▪ Consultation activities with the USFWS and NOAA Fisheries, including date of pre-BA meeting if one was attended, and names of the USFWS and NOAA biologists attending	
Project Location	▪ Project location (milepost begin/end of project, township/range, latitude/longitude, etc.)	Include vicinity map.
Project Description	▪ General project description, overall timeline, project footprint, and environmental benefits. ▪ Deconstruct project in to its components (per the BA form, incorporate detailed project component information or modules into the project description as necessary) then discuss detailed project timeline and sequencing ▪ Construction activities and types of equipment ▪ Secondary project features (staging areas, detours, waste/stockpile areas, etc.) and directly related BMPs	Photos or simple project plans may be inserted in this section, or more detailed figures may be referenced in the appendices. Use the modules in the BA form to facilitate incorporation of activity descriptions into the BA.
Project Vicinity	▪ Project setting and land use ▪ Watershed in which project is located, 6th field HUC ▪ Wetlands ▪ Geography and Soils ▪ Vegetation	Include vicinity map. Additional maps or aerial photographs as needed to illustrate resource or project characteristics.
Effects of Project on Environment	▪ Direct Effects ▪ Indirect effects ▪ Effects associated with interrelated activities ▪ Effect Associated with interdependent activities	Characterize the physical, chemical and biological impacts of project activities and describe the geographic extent of these activities

Table 3-1 (continued). Example of biological assessment format.

Section Heading	Contents of Section and Subheadings	Notes
Impact Avoidance and Minimization Measures	▪ Impact avoidance and minimization measures (minimization measures [MMs], best management practices [BMPs], conservation measures, and performance standards) ▪ Other applicable documents if available (e.g., temporary erosion & sedimentation control [TESC] plan, spill prevention, control, & countermeasures [SPCC] plan, memorandums of understanding [MOUs], etc.)	Highlight project features designed to minimize impacts. Compile MMs into a single list or summary, including additional MMs that may be identified for specific species.
Project Action Area	▪ Definition and delineation of action area with supporting rationale ▪ Map of action area	Insert a map or aerial photo with action area identified.
Species List	▪ List of species and habitats addressed in the BA ▪ Explanation of why other species on NOAA Fisheries or USFWS lists are not addressed in the BA	Include a table identifying listed and proposed species addressed in BA. Provide detailed information on site-specific species occurrence and habitat conditions. Place general information on species and habitat requirements in appendices.
Environmental Baseline within the Action Area	▪ Analyze presence and condition of habitat features as they pertain to species addressed in the BA (describing applicable baseline conditions only, focusing on elements necessary to complete the analysis of effects)	Photos and maps, which are helpful for federal reviewers, may be inserted in this section.
Terrestrial species or Marine aquatic species	▪ Provide baseline descriptions for terrestrial and marine species as applicable. ▪ Assessment of key habitat features for species. ▪ Assessment of project effects on existing environmental conditions at project site scale and/or action area scale	If the project has no aquatic impacts and is isolated from aquatic habitat, provide information on the terrestrial environment only.
Freshwater aquatic species	▪ Summary table of aquatic baseline conditions and anticipated impacts at watershed and project scales (in the body of the BA) ▪ Citation of framework (USFWS or NOAA Fisheries) used for this analysis ▪ Summarize assessment of all relevant pathways and indicators that will be affected by the project and for which data are sufficient (provide detailed analyses in BA appendices) ▪ Summarize assessment of project effects on the baseline at watershed and/or action area scales (provide detailed analyses in BA appendices)	For freshwater species provide NOAA Fisheries or USFWS matrices. Only include summary of pathways and indicators that will be affected by project activities within the BA Environmental Baseline section. Use limiting factor analysis, limiting factor reports, aerial photos, field investigations, and consultation with professionals for supporting information.

Table 3-1 (continued). Example of biological assessment format.

Section Heading	Contents of Section and Subheadings	Notes
Occurrence of Federally Listed and Proposed Species in the Action Area	▪ Species occurrence in the action area, including life history stages that occur within the action area ▪ Presence or absence of suitable habitat for listed and proposed species in the action area ▪ Presence or absence of critical habitat in the action area	Address terrestrial and aquatic species separately, as indicated in the BA form.
Effects of Project on Species and Critical Habitats	▪ Exposure and Response analyses ▪ If exposure likely: ▪ Assessment of response to direct effects of the proposed action ▪ Assessment of response to indirect effects of the proposed action ▪ Assessment of effects of interrelated and interdependent actions ▪ Assessment of cumulative effects of the proposed action (for formal consultations only)	Tie potential effects to compliance with species recovery plans, management plans, and/or habitat conservation plans. Analyze in detail only project impacts that potentially affect listed species and critical habitat. Take into consideration proposed impact minimization measures and BMPs.
Conclusions and Effect Determinations	▪ Listed and proposed species, and/or designated and proposed critical habitat ▪ Summary of primary project impacts on species and habitats ▪ Effect determination and summary of rationale, for each species/critical habitat analyzed	Place all information on candidate species in BA appendix.
References	▪ List of information resources used in BA preparation	
Appendices	▪ WSDOT Fish Removal Protocols and Standards ▪ Species Lists from USFWS and NOAA Fisheries ▪ Biology of Listed Species ▪ Candidate Species Information ▪ Essential Fish Habitat Assessment ▪ Environmental Baseline for Freshwater Aquatic Habitats	
WSDOT Fish Removal Protocols and Standards	▪ (Include if applicable)	
Official Species Lists	▪ Species Lists from USFWS and NOAA Fisheries	Lists are available on-line on agency websites.
Biology of Listed Species	▪ General information on life history and habitat requirements	

Table 3-1 (continued). Example of biological assessment format.

Section Heading	Contents of Section and Subheadings	Notes
Candidate Species Information	▪ Occurrence of candidate species in the project action area ▪ Analysis of effects ▪ Effect determinations	
Essential Fish Habitat (EFH) Assessment	▪ Federal mandate (Magnuson-Stevens Act) ▪ EFH managed species potentially present in project vicinity ▪ Elements of EFH present in project vicinity ▪ Analysis of project impacts, referencing ESA Analysis of Effects section above if necessary ▪ Effect determination for EFH	Address EFH separately from ESA analysis: entire EFH discussion is in BA appendix, not body of BA.
Environmental Baseline for Aquatic Habitats	▪ Detailed environmental baseline discussion of the NOAA Fisheries/USFWS indicators and pathways	

Brief descriptions of each of the sections within a BA are provided below. Many of these discussions are accompanied by brief excerpts from BAs that exemplify common errors or illustrate high-quality BA writing.

3.1 Executive Summary or Summary Section

The executive summary or summary is a one- to two-page summary of the proposed action, project location, effects on listed species and critical habitat, impact minimization measures, and effect determinations. For proposed species, include a statement as to whether or not the project is likely to jeopardize the species or adversely modify proposed critical habitat.

The executive summary or summary should clearly identify the watershed in which the project site is located by the 6th-field hydrologic unit code (HUC), to facilitate NOAA Fisheries tracking of the project in its database. To identify the 6th-field HUC for the project, see the following website: <http://nppc.bpa.gov/open_window.htm>. For general information on HUCs, see <http://water.usgs.gov/GIS/huc_name.txt>.

An *executive summary* is intended to stand on its own as a self-contained document and appears in front of the table of contents. A *summary* is included in the main body of text.

3.2 Introduction

The introduction to a BA should provide the following information:

- Name of the project proponent
- Clear identification of the federal nexus of the project
- Project purpose, need, and history, if relevant (not the same as the regulatory purpose and need statement required in NEPA documents)
- Location of project
- Project description.

The BA introduction should describe the rationale for preparing the BA in light of ESA requirements. Include the specific federal nexus for the project. The project purpose and need statement should provide a clear statement of purpose for the proposed project, as well as a brief description of proposed actions in relation to the needs discussed. (This is not the same as the NEPA purpose and need statement, which has stringent regulatory requirements and implications.) If the project is related to an ongoing series of projects or actions, provide a brief project history. This discussion is optional; however, it can provide reviewers with useful insight into the larger picture or context of the project.

Consultation activities with NOAA Fisheries and USFWS can be summarized in a paragraph that reviews early consultation efforts and submittal of species list requests to the federal Services. This provides readers of the BA with evidence that the required documents have been requested and received by the project biologist or action agency. If project representatives attended a pre-BA meeting, provide the date of the meeting and the names of the USFWS and NOAA biologists attending, so that the BA can be assigned to a reviewer who participated in the pre-BA meeting.

Following is an example of a well-written BA introduction, minus a detailed project description, which included a vicinity map:

> The Washington State Department of Transportation (WSDOT), with funding from the Federal Highway Administration (FHWA), proposes to repair and stabilize bank surface erosion adjacent to the Lupine Creek Bridge located on SR 0 at MP 0.00. The purpose of the project is to stabilize bank erosion in order to prevent continued bridge scour and avoid bridge stability problems.
>
> The project is located in Skamania County, Washington, approximately 34 miles east of Astertown and 0.4 miles north of the Flax River (see Figure 1 *[vicinity map]*). Lupine Creek Bridge crosses Lupine Creek at river mile (RM) 0.6. SR 0 is a two-lane asphalt roadway that serves as the primary east-west route along the Flax River on the Washington side.
>
> An endangered species listing dated March 28, 2001 (Appendix A) provided by the National Marine Fisheries Service (NOAA Fisheries) indicates the potential presence of species listed under the Endangered Species Act (ESA) in the vicinity of the project site (Table 3-2). These species include threatened Lower Columbia evolutionarily significant unit (ESU) chinook salmon (*Onchorhynchus tshawytscha*), threatened Columbia River ESU chum salmon (*O. nerka*), and threatened Lower Columbia River ESU steelhead (*O. mykiss*).

Table 3-2. Listed aquatic species potentially present in the project action area.

Species	Federal Status	Proposed Critical Habitat
Lower Columbia River ESU chinook salmon	Threatened	Yes
Columbia River ESU chum salmon	Threatened	Yes
Lower Columbia River ESU steelhead	Threatened	Yes

> As required under Section 7(c) of the ESA, this biological assessment was prepared to address potential impacts on these aquatic species resulting from the proposed bank protection project. Listed and proposed species under U.S. Fish and Wildlife Service (USFWS) jurisdiction are addressed in a separate document.
>
> The project action area is located within proposed critical habitat for the Lower Columbia River ESU chinook salmon, Columbia River ESU chum salmon, and Lower Columbia River ESU steelhead. Therefore, critical habitat for these species is addressed in this report.

The project was presented at the May 2005 pre-biological assessment meeting, which was attended by Joe Brown of USFWS and Tom Smith of NOAA.

On *month/day/year*, biologists from WSDOT conducted a field review to gain a thorough understanding of the proposed activities, evaluate the existing habitat of listed and candidate species in the action area, and identify potential project impacts on these species. Another site visit occurred on *month/day/year* by biologists from WSDOT and the Washington Department of Fish and Wildlife (WDFW) to review minor revisions to the proposed action. Species under NOAA Fisheries jurisdiction were further investigated by means of personal communications with local fish and wildlife authorities and review of pertinent literature, including the WDFW Priority Habitats and Species database.

3.2.1 Project Location

The Project Setting or Location section should provide reviewers with enough information to convey a clear understanding of the environmental surroundings and geographic area in which the project is situated, as well as activities that could influence, or have influenced, the project area over time. In this portion of the BA, related photographs can be particularly helpful for reviewers.

The description of the project location should include information on the following topics:

- State route or interstate identification
- Milepost start and end of project
- County
- Township, section, and range
- Latitude and longitude

A vicinity map should be provided to visually identify the location of the project area; aerial photographs can also provide good contextual information.

3.2.2 Project Description

The Project Description section begins with an overview of the proposed action and project footprint, including overall project timeline and environmental benefits. The project footprint discussion should provide an overview of the extent of temporary and permanent disturbance associated with the project. The environmental benefits section should provide an overview of the anticipated benefits associated with the project.

The Project Description section should then provide the reader with a detailed picture of all proposed project actions, by deconstructing the action into all of its elements. The proposed project action discussion should summarize each of the proposed project elements, including

new impervious surface area that will be generated by the project. This discussion should also describe specific construction methods, materials, and techniques associated with each project element. The section should conclude with a discussion of the sequencing of project elements and detailed timeline projections. The equipment that will be needed to construct each element and the timing of each of the proposed project elements should be summarized in the detailed project sequencing and timeline section. In addition, the project biologist should incorporate into the project description section of the BA form all detailed project element modules that apply to the project.

In the Project Description section, the discussion of construction activities should provide sufficient detail for a reviewer to clearly understand the project, all of its elements, and the general extent of potential impacts.

3.2.2.1 Overall and Detailed Project Timelines

As part of the project overview, a construction schedule should be provided illustrating the overall project timeframe. In the more detailed discussion of the deconstructed action, a detailed sequence and timeline illustrating the chronology or phasing of specific project elements or actions should be provided. If possible, it is preferable to include the specific dates or months during which construction will occur. Seasonal references are not sufficiently precise for the purposes of reviewers.

Following is an example of an inadequately described construction schedule in a BA recently reviewed by the Services:

> Construction of this improvement is scheduled to begin in the summer of 2001. It is estimated to take 50 working days to complete this project.

One reviewer responded:

> *Can we get more specific dates? Or at least specific months? How does this timing relate to the fish window and other guidelines for construction timing?*

Often a BA is written before a project has been funded, advertised for contractor bids, or fully designed, in which case specific dates may not be available to the project biologist. In this situation, providing an example of how construction phasing and timing would occur is helpful for reviewers. Providing a visual overview of the project elements and chronology, as would be illustrated in a Microsoft Project schedule spreadsheet, is particularly effective.

To allow for unforeseen complications or prohibitive weather conditions during project construction, the BA may stipulate more time for completion of construction activities than that estimated by project engineers. For example, a project biologist may add 10 percent contingency time to a project by extending the project end date, or a few days may be added to the contract time (e.g., stipulating 260 rather than 240 days). Before making these revisions to the project schedule, the project biologist should check with the project manager to ensure that this contingency time is considered useful. Providing contingency time often ensures that the BA

adequately addresses project activities in the event that the project is slightly delayed or behind schedule.

3.2.2.2 Project Footprint

The project area or project footprint should be identified (i.e., the geographic area contained within the limits of the proposed activities). The project footprint (i.e., where project or construction activities will occur) may be smaller than the project action area, which is discussed more fully below. The Project Footprint section should summarize the temporary and permanent disturbances or physical impacts associated with the proposed construction activities (construction methods, construction equipment, secondary project features, and major project elements). Impacts associated with vegetation removal, aquatic habitat disturbance, disturbance to other habitat types, and new impervious surface area should be specified in this section.

3.2.2.3 Proposed Project Actions

This section should provide a detailed account of the deconstructed project, describing each of the primary construction elements or project features proposed as part of the action. This description should be accompanied by plan drawings, as appropriate, to illustrate the locations and configuration of the project components and proposed activities. Project plans should be kept readable and simple, and may be included in this section or referenced in a BA appendix. Project elements should be listed in chronological order, if possible.

The locations of various secondary project features, including staging areas, waste sites, stockpile sites, and construction material source sites (e.g., rock quarries, or gravel pits developed specifically because of this project), if known, should also be addressed in the BA to provide reviewers with a complete picture of the extent of the proposed project. These areas are considered during the analysis of direct and indirect effects or are addressed as interrelated and interdependent activities or actions of the proposed project and may appreciably expand the action area of a project.

As needed, more detailed project description information or modules can be incorporated into the project description section. In the BA form, most major project elements, associated construction activities, methods, equipment, timing, etc. are addressed in the project description section of the form. However, the modules contain additional information pertaining to specific activities and can be incorporated into the project description as needed. If no specific module or information is provided for the proposed project activities, the project biologist should use the type of information provided in the form as examples of the types of items to include in the BA.

As part of the detailed project sequencing and timeline section, a list or description of the required site preparation and construction equipment should be provided for each impact or project element, if the equipment is capable of producing high noise levels or measurable impacts on listed species or habitats. For many projects the standard equipment list of bulldozers, dump trucks, etc., is suitable. However, some projects require special equipment, such as rock drills or spiders for in-water work, and these should be listed explicitly in the BA.

3.3 Project Vicinity

The Project Vicinity section should provide reviewers with enough information to convey a clear understanding of the environmental surroundings and geographic area in which the project is situated, as well as activities that could influence, or have influenced, the project area over time. In this portion of the BA, related photographs can be particularly helpful for reviewers.

The description of the project vicinity should include information on the following topics:

- General habitat features
- General development patterns in the vicinity of the project
- Past and present uses of the lands surrounding the project area.
- Watershed in which project is located:
  - Water bodies in which work will occur
  - Water resource inventory area (WRIA) identification
  - Hydrologic unit code (for information on 6th-field HUCs, see <http://nppc.bpa.gov/open_window.htm>).

Additional information may be provided for the following topics:

- Wetlands
- Local topography and geomorphology
- Geology and Soils
- Predominant vegetation types

The discussion of habitat features present in the vicinity of the project can be general in nature. The habitat discussion should become more specific later in the document as environmental baseline conditions in the project action area are discussed. The discussion of habitat should be pertinent to the terrestrial or aquatic species addressed in the BA.

3.4 Effects of Project on Environment- Physical, Biological, and Chemical Effects

To help determine the project action area, the geographic extent of project impacts must be determined. The project biologist should determine the direct and indirect physical, biological and chemical impacts associated with each of the proposed project elements and with interrelated

and interdependent activities. The biologist must then determine the magnitude, extent, and timing of when these impacts will occur, and most importantly the geographic extent of areas that will be affected by these impacts. The action area represents a geographic composite of all the areas that will sustain impacts associated with project activities.

For projects that will require formal consultation (i.e., that are "likely to adversely affect" a listed species) cumulative effect information should be included in the BA. However, cumulative effect information does not influence the size of the action area and is not considered in the final effect determinations for species.

3.4.1 Direct Effects

Direct effects are defined as "direct or immediate effects of the project." Direct effects include all immediate impacts (adverse and beneficial) from project-related actions (e.g., construction-related impacts such as noise disturbance or loss of habitat) and those disturbances that are directly related to project elements that occur very close to the time of the action itself (e.g., sedimentation).

3.4.2 Indirect Effects

Indirect effects include those effects that are caused by or will result from the proposed action and are later in time (generally after the construction period), but are still reasonably certain to occur. Indirect impacts may result from the operation of the project or future activities related to the project (e.g., future impacts from trail use, induced land use change or growth, increased traffic). The BA must examine these continued impacts (adverse and beneficial) in order to ascertain overall project-related impacts. The analysis of indirect effects can be complex and should include an assessment of the impacts related to the following issues:

- Does the project create a new facility (e.g., a new road or interchange) or increase the capacity of or access to the existing system?
- Is surrounding development contingent on the proposed project? In some cases developments are tied by permit condition or Growth Management Act concurrency to certain transportation improvements.
- Is any anticipated future development the result of (caused by or dependent on) the project?

The *zone of influence*, which is defined for project-related traffic and development issues as part of the indirect effects analysis, may help to define the limits of the action area. The process of indirect effects analysis and defining the zone of influence is summarized in *Guidance for Preparing Biological Assessments: ESA, Indirect Effects, Transportation and Development* (WSDOT 2001, revised in 2003). At the very least, an indirect effects analysis should address all 10 questions that are posed in the WSDOT indirect effects guidance document. A more

detailed discussion of indirect effects, including the WSDOT guidance, is provided in PART 2, INDIRECT EFFECTS.

3.4.3 Effects of Interrelated and Interdependent Actions/Activities

Authors often mistakenly refer to interdependent or interrelated *effects or impacts*. This section of a BA should discuss effects resulting from interdependent or interrelated *actions* or *activities* associated with the proposed project.

An interdependent activity is an activity that has no independent utility apart from the proposed action. An agency reviewer made the following comment:

> *Examples of interdependent actions for a timber sale include the construction, maintenance, and use of a road required to access the sale area.*

An interrelated activity is an action that is part of a larger action and depends on the larger action for its justification. The proposed action itself can be part of a larger action, or may require additional related actions for its completion. An agency reviewer made the following comment:

> *Examples of interrelated activities for a timber sale include the post-timber-harvest activities such as slash burning, site preparation, planting, and brush control.*

To determine whether an activity is interrelated with or interdependent upon the proposed action under consultation, the *but-for* test can be applied. An example of an effective application of the *but-for* test that was suggested by agency reviewers is provided below:

> *An acre of previously vegetated land is cleared, grubbed, and graded to serve as a temporary staging area for heavy equipment used in a road construction project. The staging area would not be cleared, grubbed, and graded* ***but for*** *the road construction project.*

The two excerpts below provide examples of improper application of the *but-for* test and include reviewer comments:

> Easing traffic congestion, increasing traffic safety, and increasing bicycle/pedestrian safety would not occur but for implementation of the proposed road widening project. *The but-for test does not apply to the proposed project actions; it applies only to actions taken as a result of the proposed actions.*

> The only interrelated effect that the project may have on aquatic resources is the potential for accidental spills. *1) There is no such thing as "interrelated effect;" proper terminology is "interrelated action or activity." 2) Accidental spills and project-related pollution are direct effects on species or habitat.*

3.4.4 Cumulative Effects

There is a difference between the definitions of cumulative impacts associated with the ESA and NEPA. NEPA requires a cumulative impact analysis to address future federal, state, local, and private actions. ESA requires analysis of only future state, local, and private actions, but not federal. For a more extensive discussion, see PART 2, CUMULATIVE EFFECTS.

Under the ESA, cumulative effects are the effects of future state, local, or private (but not federal) activities (unrelated to the proposed project) that are reasonably certain to occur within the action area of a proposed project. Unlike direct and indirect effects, or interrelated or interdependent actions, cumulative effects do not influence or define the limits of the action area. Rather, the action area defined by the extent of impacts from these other activities defines the geographic scope for the cumulative effects analysis.

A future activity is reasonably certain to occur if examination of economic, administrative, or legal hurdles and plans indicates that it is likely to occur; implementation of the activity need not be guaranteed. A reviewer made the following comment:

> *An example of an action that could be considered cumulative to the primary action is a future housing development located adjacent to the federal activity of building a highway. Care should be taken to ensure that the development would not involve federal authorization or funding.*

Cumulative effects analyses are required by the ESA only for those projects undergoing formal consultation (LTAA BAs; see Table 2-1). Officially, the U.S Army Corps of Engineers defines adverse effect (LTAA) reports as *biological assessments* and NLTAA reports as *biological evaluations* or BEs (which do not require a cumulative effects analysis). However, in practice, the Corps uses these terms interchangeably.

The cumulative effects analysis does not weigh into the project's effect determination for listed and proposed species and habitats. This analysis is included in the BA for evaluation by the Services of the cumulative effects of the project upon the species as a whole.

A cumulative effects analysis should include the following:

- Provide a description and an analysis of the effects of actions that are cumulative to the primary action but not related to it. Cumulative effects include the effects of future, local, state, or private activities, but not federal activities, which are reasonably certain to occur within the action area of the proposed project.
- Any research findings that are used in the analysis of the effects of an action should be cited. This adds to the credibility of the analysis.

3.5 Impact Avoidance and Minimization Measures

The BA should highlight the measures that have been taken to avoid or minimize project impacts. These may include design elements of the project, such as the construction of retaining walls to minimize impacts on streams, or use of steel piles or untreated wood piles to avoid contamination of aquatic habitats, in addition to other impact minimization measures (MMs) and best management practices (BMPs). MMs and BMPs are applicable to every project type. Conservation measures are measures taken to help recover listed species and are not applicable to every project. Performance standards are measurable benchmarks for a particular performance objective agreed to by the Services and the action agency, and also do not apply to every project or to every action within a project.

Descriptions of MMs and BMPs should be clearly worded and should describe specific actions to be implemented to eliminate or reduce adverse effects of the action in general. Because the Services cannot consult on recommendations, but only on project elements or methods that will actually occur, choose language such as *will* or *shall be implemented*, instead of *may*, *to the practicable extent possible*, *frequently*, etc. Transportation-related activities and related impact minimization measures are discussed in PART 2, IMPACT AVOIDANCE AND MINIMIZATION MEASURES.

Specific project-related impacts on habitat features and species in the action area are assessed in the Effects of Project on Species and Critical Habitats section of the BA, where additional MMs or conservation measures for individual species may also be identified. A summary of construction-related and species-related MMs, conservation measures, and BMPs should be provided in the BA to be considered as part of the impact assessment for species and habitats and to help substantiate the rationale for effect determinations.

While each construction technique may require specific MMs to avoid or minimize its potential impacts, project-related impacts may be avoided or reduced through careful planning, design, and timing. A project biologist can work with project designers and engineers throughout the entire design process, from pre-project planning to project implementation, to aid in identifying potential impacts and avoidance and minimization measures.

For example, project biologists may be called upon to help identify sensitive species and habitats in the general vicinity of a proposed project prior to any design work, so that these issues will be considered and represented in any subsequent planning or project design. Similarly, a project biologist can help designers identify whether proposed project designs or methods would adversely affect a listed species or its habitat, and whether alternative designs would minimize those impacts or avoid the need for formal consultation. A project biologist can also help project managers identify whether timing restrictions are necessary for a project, so that project timing and phasing can be planned appropriately to avoid or minimize impacts on listed species.

Useful information sources for determining whether habitat and species impacts can be avoided include the following:

- Habitat management plans for nest territories (see PART 3, RECOVERY PLANS: INFORMATION AND RESOURCES)
- ESA highway runoff effects guidance (see PART 2, STORMWATER)
- Definitions of *harm* and *take* under the ESA, as related to habitat and listed species (see PART 3, DEFINITIONS FOR BIOLOGICAL ASSESSMENTS AND CONSULTATION, and/or PART 3, WORKING WITH LISTED SALMONIDS)
- ESA *take* avoidance plans for suitable habitat
- Salmon information websites (see PART 3, WORKING WITH LISTED SALMONIDS)
- Information on wildlife and plant sensitive periods (see PART 3, WILDLIFE SENSITIVE PERIODS CALENDAR, and PART 3, IDENTIFICATION WINDOW FOR THREATENED AND ENDANGERED PLANTS IN WASHINGTON STATE).

Examples of alternative construction methods that may be helpful include the following:

- Vibratory pile driving rather than hammer pile driving techniques
- Nonexplosive expansion materials rather than explosive materials
- Special equipment or techniques known to have lower or fewer impacts
- Noise shields to help contain the radius of sound impacts.

Many MMs or BMPs identified by project biologists within the BA may be consistent with WSDOT standard specifications and can easily be incorporated into contract documents. However, other impact minimization measures or conservation measures that are not standard specifications (e.g., timing restrictions) may be identified by a project biologist as necessary to minimize impacts on species; these measures must be coordinated with the project manager so that they can be incorporated into contract documents as special provisions (for more information, see PART 2, IMPACT AVOIDANCE AND MINIMIZATION MEASURES).

3.5.1 Summary of Impact Avoidance and Minimization Measures

The BA should provide the reviewer with a consolidated list of construction-related and species-related impact minimization measures for easy reference when examining the effect determination section of the BA.

3.6 Project Action Area

This section of the BA contains the definition of and supporting rationale for the *action area* for the proposed project. Normally, a map is also provided to illustrate the extent of the action area.

The action area for a proposed project is defined as all areas to be affected directly and indirectly by the federal action, and not merely the immediate area involved in the action (Endangered Species Act (50 CFR 17.11). The action area includes the geographic extent of physical, biological, and chemical impacts of the project, which in turn can be influenced by the implementation of MMs and BMPs. Consequently, the action area is usually larger than the project area and sometimes larger than the project vicinity.

The action area includes but is not limited to the following areas: equipment staging areas, detour routes around the project area on a case-by-case basis[1], material sources that are developed due to the project, water bodies receiving highway runoff, the river upstream and downstream of a bridge project, and wetland mitigation sites or other mitigation sites resulting from project impacts. Similarly, the extent of noise impacts should also be included in the action area. For example, if the noise impacts associated with a project extend to a one-mile radius, the action area encompasses this entire area (see PART 2, NOISE IMPACT ASSESSMENT, for more information on how to assess this impact).

The action area is determined independently of the effects of the action on listed species and critical habitat. After the action area is identified, then the distribution of the listed species and critical habitat is overlaid on the same map to determine which species and critical habitat may be subject to effects of the action.

In addition to clearly defining the action area limits, a thorough description of the action area must provide a rationale for these limits. A graphic representation of these limits can prove invaluable for reviewers. The discussion of the action area should include detailed information pertaining to the anticipated impacts of the proposed action upon the areas and resources surrounding the project. Required additional information to support the action area definition includes:

- Describe land uses within the action area.
- Identify any water resources within the action area (e.g., rivers, tributaries, wetlands, floodplains, and aquifer recharge areas).
- Document existing environmental conditions or environmental baseline conditions (i.e., substrate, water quality, tides and currents [where

1 Assess whether the detour route will result in environmental impacts that significantly differ from existing conditions. If a road being used for a detour does not normally support heavy traffic and the detour will divert heavy traffic onto it, the project biologist might consider including a detour route in the action area. Similarly, if the detour would result in noise impacts that do not occur under normal conditions, the project biologist would likely consider the detour route as part of the action area.

applicable], flow rate, macrofauna, vegetation, wintering concentrations, perch trees, forage areas, spawning or rearing habitats, etc.).

Several examples of properly defined and illustrated action areas are provided in PART 2, ACTION AREA.

3.7 Species List(s)

It is a statutory requirement that the BA be based on a current species list. A table listing species and critical habitat covered in the BA provides reviewers with a concise summary of the species and critical habitats addressed throughout the report. This table should provide common names of species, scientific names of the species or subspecies, and federal status (state status can be included but is not required) of each of these species (see Table 3-2). The table should also indicate whether or not there is designated or proposed critical habitat within the project vicinity.

If a species list was received from the Services, a formal species listing citation should be provided. This listing and the accompanying letter, or a printout of the species list from the agency website, should be included in the BA report as an appendix. Also provide a summary of the date(s) on which field reviews were conducted to assess project impacts and environmental baseline conditions in the project action area.

This section of the BA should also identify any species included on the USFWS or NOAA Fisheries lists that are not addressed in the BA, with a brief explanation of the reason for not including them in the BA analysis.

3.8 Environmental Baseline within the Project Action Area

The project biologist must characterize the habitat features used by listed species present within both the project vicinity and the project action area, and describe how the habitat elements will be affected by the proposed action. The current condition of the habitat in the action area and the factors responsible for that condition should be discussed with appropriate supporting documentation.

The discussion of existing environmental conditions (environmental baseline conditions) should include a summary of relevant land use and past and present activities that relate to the species and critical habitats potentially occurring in the action area, as well as those impacts that directly define the action area (development areas, impervious surface area, etc.). A more detailed discussion of this topic is provided in PART 2, ENVIRONMENTAL BASELINE WITHIN THE ACTION AREA.

The project biologist completes an assessment of existing environmental or baseline conditions (and documents these characteristics) during a thorough field review of the action area. This

section of the BA should also provide a brief synopsis of the date(s) on which project biologists visited the project site, the habitat parameters that were assessed relevant to the species identified, and the methods used. This information may also appear as part of the action area discussion or in the introduction section of a BA.

3.8.1 Environmental Baseline for Terrestrial Species

If listed terrestrial species are potentially present in the project vicinity, the BA should assess and describe in detail the relevant habitat characteristics essential to the species occurring within the action area (e.g., foraging habitat, nesting habitat, prey availability overwintering areas, and perch trees). The existing environmental conditions within the action area should be identified and discussed in relation to the project impacts. Habitat characteristics relevant to designated critical habitat should also be addressed. If Primary Constituent Elements (PCEs) have been defined for a species' critical habitat, these elements should be identified, and if specific PCEs are present within the action area or could be affected by the proposed action, they should be described in detail.

3.8.2 Environmental Baseline for Freshwater Aquatic Species

For projects that could potentially affect listed freshwater aquatic species, the project biologist should systematically assess the environmental baseline conditions or, more specifically, the pertinent aquatic habitat pathway indicators defined in the NOAA Fisheries and USFWS pathways and indicators matrices (see PART 2, ENVIRONMENTAL BASELINE WITHIN THE ACTION AREA, Tables 9-4 through 9-7). Assess all pathway indicators that relate to potential effects on listed species and critical habitat from the proposed action, including the following:

- Water quality parameters (temperature, sediment loading, chemical and nutrient contamination)
- Habitat access (physical barriers to fish passage)
- Habitat elements (substrate composition, large woody debris, pool frequency measures for salmon or bull trout, pool quality, presence of large pools, off-channel habitats, and refugia)
- Channel conditions and dynamics (width/depth ratio for salmon or bull trout, stream bank condition, floodplain connectivity)
- Flow or hydrology (change in peak/base flows, increase in drainage network due to human activities or roads)
- Watershed conditions (road density and location, disturbance history, and presence of riparian reserves).

If bull trout are present, the subpopulation characteristics in the watershed must be assessed, and the assessment of species and habitat conditions must be integrated (i.e., will anticipated impacts on habitat conditions lead to species impacts?). If Primary Constituent Elements (PCEs) have been defined for a species' critical habitat, these elements should be identified, and if specific PCEs are present within the action area or could be affected by the proposed action, they should be described in detail.

An overview of this baseline information should be provided in a table in the body of the BA. A summary of those pathways or indicators that will be affected by the proposed action should accompany the table in the body of the BA. Detailed description and analysis of all of the indicators and pathways and aquatic environmental baseline information should be included in a BA appendix. The USFWS and NOAA Fisheries matrices apply to freshwater habitats, not marine systems.

3.8.3 Environmental Baseline for Marine Aquatic Species

If listed marine species are potentially present in the project vicinity, the BA should assess and describe in detail the relevant habitat characteristics essential to the species occurring within the action area (e.g., foraging habitat, forage fish spawning areas, prey concentration areas, and haul outs). The existing environmental conditions within the action area should be identified and discussed in relation to the project impacts. Habitat characteristics relevant to designated critical habitat should also be addressed. If Primary Constituent Elements (PCEs) have been defined for a species' critical habitat, these elements should be identified, and if specific PCEs are present within the action area or could be affected by the proposed action, they should be described in detail.

3.9 Occurrence of Federally Listed and Proposed Species in the Project Action Area

This section of the BA should focus on behavioral characteristics of species and habitat elements that are central to completing the analysis of effects and effect determinations. The section should include current site-specific information about each species, their use of the action area, and the suitability of the habitat in the action area for each species.

The species and habitat information provided in the main body of the BA should be brief and limited to the information needed to support the overall analysis of effects and effect determinations. For example, information on nesting habits is unnecessary if only foraging habitat exists within the action area. The project biologist should not address the entire life history of a species or conservation recommendations; however, clear and concise information must be provided on each species that may be present, when it is present (i.e., year-round, temporary, or seasonal), and its life stage and activity during that timeframe (i.e., incubating, spawning, rearing, migrating through an area, overwintering, roosting, nesting, or foraging).

General life history information is not necessary unless it pertains directly to the proposed project.

If it is pertinent to the assessment and is available from a reliable source (such as recovery plans), the information provided may also include current population estimates, trends, conservation needs, or threats to species in the action area.

Citations of relevant scientific literature or research findings should be provided throughout the BA as they are mentioned. And in all cases the project biologist should identify the information sources used for determining the occurrence of listed species (e.g., PHS database, local agency biologists, or *Salmon and Steelhead Status Inventory* [SASSI]).

Items that should be addressed or provided in this section of the BA include the following, which are discussed more fully below:

- Citations of information sources for each species identified as potentially occurring in the vicinity of the project through listings provided by the Services or interviews with local experts
- Site-specific species occurrence and habitat information:
  - Timing
  - Life phases
  - Distribution
  - Occurrence within action area
  - Designated ESU or distinct population segment (DPS)
  - Presence of designated critical habitat
  - Presence and occupancy of suitable habitat
  - Description of habitat types.

To ensure the protection of listed species in the site vicinity, no site-specific information or exact locations of species present, as identified in PHS maps or otherwise, should be included in this public document.

The BA is focused on the potential impacts upon a specific population of the listed species potentially occurring in the vicinity of the project. The run timing, or timing of species use of the project footprint and action area, local status information, and presence or absence of suitable habitat or designated critical habitat should be provided for the species or specific run using the action area. It is important to discuss species presence year-round if permanent or year-round impacts are expected. Essential information includes the location of the project in relation to designated territories, or areas containing threatened or endangered evolutionarily significant

units or distinct population segments (ESU/DPS) of salmonids, as well as the characteristics and presence of designated critical habitat within the project action area.

Often BAs fail to provide adequate information on species life histories, habitat requirements, and ecology, especially for local populations, at the action area scale. Another common shortcoming in BAs is to state illogical or erroneous assumptions (e.g., because the area has only second-growth vegetation, there is no bald eagle use). Information provided in this section should be logical, detailed, and empirically sound. The project biologist should strive to provide a comparative analysis by describing the available habitat features in comparison to habitat features that define suitable habitat. This analysis should be presented for species within the project action area and in the project vicinity, to determine whether species may move through the project action area en route to foraging or nesting habitats.

An example of this type of discussion is provided below to illustrate how a project biologist can effectively include site-specific information for each species addressed in the BA. Following is a well-written example of a project biologist's discussion of occurrence of one species in the project vicinity:

> Bald Eagle (Threatened)
>
> *Occurrence*. There are no bald eagle breeding occurrences within a 2.8-mile radius of the project action area (WDFW 2001). The nearest breeding occurrences are the Bear Creek nesting territory (about 2.9 miles northeast of the project site) and the Cougar Lake nesting territory (about 2.8 miles west-southwest of the project site). WDFW has documented a bald eagle wintering concentration site near the confluence of Lynx Creek with the Marten River. This area encompasses a 5-mile segment of the north shore of the Marten River from Cougar Lake to Lynx Creek (the project area is located 0.5 miles from the wintering area boundary). WDFW records report regular concentrations of 5 to 20 bald eagles in this area from November 1 to March 1. The presence of eagles is likely associated with salmonid and waterfowl foraging opportunities, availability of suitable roost and perch trees, and relatively low levels of human disturbance.
>
> Due to the lack of suitably large nest trees, bald eagles are not expected to initiate nesting within the action area. Perch trees of adequate size and form are present in the action area, as well as marginally suitable foraging habitat. Bald eagles are more likely to expend foraging energy in more productive habitats on the Marten River. Due to the proximity of the project area to the Marten River corridor, there is potential for transient bald eagles to occasionally fly over the Lynx Creek Bridge vicinity.
>
> *Critical Habitat*. Currently (05/11/01) there is no designated critical habitat for bald eagles in Washington State.

As illustrated above, this section of the BA provides information pertaining to occurrence of a species within the immediate vicinity of the project area and in the action area itself, and details the specific habitat types and features within this area. The project biologist must identify

whether any designated critical habitat is located in the project action area, as illustrated in the example above. If critical habitat PCEs are present within the action area, they too should be characterized.

In addition, a project biologist may want to include sketches of habitat types in the project vicinity, completed during a site visit, or aerial photos or maps of the project area showing locations of different habitat types. Sketches are particularly useful for identifying subtle in-channel habitat variations that may not be readily apparent in a photograph.

General life history and habitat requirement information should be included in the appendices of the BA. This discussion should provide ecology and life history information relevant to the specific project and its action area. Some general species-level information, such as species information on a regional or statewide scale, can provide useful background for reviewers; however, this information should be kept to a minimum. For information on species occurring in Washington state, see LISTED SPECIES IN WASHINGTON STATE: USFWS AND NOAA FISHERIES JURISDICTION, in PART 3.

Following is an example of information on the general habitat requirements and distribution of bald eagles that could be included in the appendix of the BA:

> *Habits, Habitat Requirements, and Distribution*. The breeding habitat of the bald eagle in the Pacific Northwest is generally characterized by the presence of dominant or co-dominant conifer trees in old-growth forests that overlook and provide a clear flight path to aquatic foraging areas (Anthony et al. 1982). Other factors influencing bald eagle breeding habitat selection include tree height, diameter, branching configuration, decadence, forest stand structural diversity, and human disturbance (Grubb 1976). In western Washington, mean nest tree height averages 116 feet, and the mean diameter of nest trees in Washington and western Oregon is approximately 70 inches at breast height (USFWS 1986). Distance of bald eagle nest trees to water averages 282 feet in western Washington but can vary to one-half mile in other Pacific Northwest states (USFWS 1986). Nesting activities generally occur between January 1 and August 31. Bald eagles are most vulnerable to human activity disturbance during the first 12 weeks of the critical nesting period (USFWS 1977).
>
> Wintering bald eagles are concentrated in areas where prey is abundant and disturbance is minimal. The overriding strategy is to conserve energy through efficient feeding behaviors, such as group foraging and gorging, and by using protective microclimates and sedentary behavior to minimize energy expenditure (Stalmaster and Gessaman 1984). Rivers, streams, estuaries, and large lakes with spawning salmon or waterfowl concentrations are important foraging areas for wintering bald eagles. Eagles typically select foraging perches near feeding areas that afford the best views, often using the highest perch sites available. Communal night roosting habitat is generally in close proximity to primary feeding areas and is often located in forest stands with old-growth components. Night roost characteristics such as topography, slope aspect, and heavy conifer foliage create favorable microclimates that insulate and buffer eagles from prevailing

cold, wind, and rain. Wintering activities in the Pacific bald eagle recovery area generally occur between November 15 and March 15 (USFWS 1986).

Discussion of essential fish habitat and analysis of project impacts on essential fish habitat should be confined to a self-contained assessment included in an appendix to the BA (see PART 2, ESSENTIAL FISH HABITAT).

3.10 Effects of Project on Species and Critical Habitats

This section presents the analysis of effects required under Section 7 of the ESA. Because consultation on essential fish habitat (EFH) is different from ESA consultation, the discussion of potential project effects on essential fish habitat should be presented in a separate document included as an Appendix to the BA (see PART 2, ESSENTIAL FISH HABITAT).

After providing project and species information in sufficient detail to define the proposed action and the potential occurrence of species in the project action area, the BA must provide an analysis of the potential effects of the project upon listed and proposed species as well as designated or proposed critical habitat. The analysis should focus on the potential of the listed species or PCEs to be exposed and what the response is expected to be. The topics addressed in the Effects Analysis section include the following:

- Direct effects
- Indirect effects
- Effects of interrelated and interdependent actions
- Compliance with existing recovery or management plans
- Potential for the project to result in incidental take of listed species
- Potential for the project to jeopardize continued existence of proposed species or adversely modify critical habitat.

For each of the project-related effects, the biologist should determine if a species or critical habitat is likely to be exposed, and identify general response to the impact, followed by a more comprehensive evaluation of its anticipated response to likely project impacts given proposed minimization measures and BMPs.

Although the ESA does not require the BA to analyze effects on candidate species, providing an assessment for these species is highly recommended. Addressing these species at the outset simplifies updating the BA in the event that the project is postponed, or when candidate species are upgraded to proposed or listed status. This information should be placed in an appendix to the BA.

In the Effects Analysis section, the project biologist should also describe anticipated *take* (as defined under the ESA) in terms of these three factors:

- The estimated number of individuals affected
- Whether the affected individuals are adults, juveniles, or both
- How the individuals will be affected, based on the endpoints discussed.

For some species, such as fish species, it is difficult or impossible to estimate the number of individuals affected, but the project biologist can address the impact in terms of space and time (e.g., all adult bull trout migrating through river mile 1 to 5 of John Doe Creek in November 2005). Construction activities that are likely to prevent reproduction, foraging during nesting, or migration to a spawning or nesting area may result in *take* of juveniles. The project biologist may be able to estimate the future number of juveniles based on historical records.

Examples of activities that are likely to affect an individual animal's ability to survive, reproduce, forage, or seek shelter include those that interfere with access to spawning grounds, shelter from predators, cold-water refuge (if the species is dependent on cold-water), or foraging habitat.

When assessing impacts on critical habitat, the project biologist addresses the primary constituent elements (PCEs) outlined in the federal listing of the designated critical habitat unit. Discuss the predicted adverse effects and the extent of the effect for each individual PCE. Adverse effects can cause harm to any or all of the PCEs without reaching the level of *adverse modification*, which is equivalent to *jeopardy*.

Often, BAs lack a logical, adequate analysis of whether a project will or will not cause direct or indirect effects. Similarly, BAs often fail to establish whether these effects are significant or discountable. The potential for project-related adverse effects is often overlooked, particularly for projects with in-water work. For example, receiving a hydraulic project approval (HPA) permit and incorporating the conditions of the HPA into the impact minimization measures of the BA does not guarantee that there will be no adverse effect. The analysis of effects must be detailed and complete, providing enough information to substantiate the rationale underlying the project biologist's effect determination.

Deconstructing the project action into its many constituent parts will help biologists ensure that all project elements are included in their analysis. Characterizing impacts associated with each of these project elements will help ensure that all project-related impacts have been evaluated. Systematically evaluating the potential for exposure and anticipated response for each species related to each project impact will ultimately ensure a robust analysis of effects that avoids the gaps in information or rationale described above.

A USFWS reviewer provided the following list of issues to help the project biologist understand the level of detail required to complete a thorough analysis of effects and to support a final effect determination, which in turn will expedite review of the BA by the Services. These issues

should be considered before and during the site visit and analysis to ensure that information is compiled as efficiently, thoroughly, and systematically as possible.

If a project is near a stream or river potentially containing listed, proposed, or candidate species, or proposed or designated critical habitat, then discussion, plans, and figures within the BA should include the following information, as appropriate, to support the effect determination (USFWS 2001):

- Activities in relation to the ordinary high water mark (OHWM)
- Cross-section and elevation views
- Direction of flow
- Amount and extent of fill or instream work (including rock and large woody debris placement)
- Amount and extent of any vegetation removal.

For a project near a wetland that is habitat for a listed species, the BA discussion, plans, and figures should include the following (at a minimum) (USFWS 2001):

- Delineation boundary as surveyed
- Wetland categories
- Amount or extent of any fill
- Amount or extent of any vegetation removal
- Location of any compensatory mitigation areas.

If a project is located near a wetland that does not provide these habitat functions, the discussion of impacts should be kept to a minimum.

If the project is located in a watershed that may contain bull trout, and anadromous fishes have access to aquatic habitats in the project action area, assume the presence of bull trout (USFWS 2001).

If a project will create sediment, the BA should address the following questions (USFWS 2001):

- Will sediment input be measurable?
- Will it be a teaspoon or truckload? Quantify the impact.
- Will potential impacts include disruption of migratory patterns, degradation of stream habitat, or impacts on forage fish species?

If a project will have short-term adverse impacts related to dewatering, diversions, fish handling, or temporary sediment input, adverse effects must be

evaluated. Remember that impacts to listed species cannot be mitigated (i.e., there is no mitigation allowed for adverse impacts to listed species). Rather, the proposed action should include minimization measures that effectively minimize the adverse effects (USFWS 2001).

If a project is treating highway runoff, treatment facilities should be included within the footprint of the project. The BA should answer these questions (USFWS 2001):

- How much new impervious surface area is treatment being provided for?
- How much of the existing impervious surface area is treatment being provided for?
- What are the proposed highway runoff treatment measures for quality and quantity?

Infiltration is still preferred by the Services.

A BA should also include information on any relevant impact minimization measures, and should discuss how the action agency can ensure that the contractor will comply (USFWS 2001) (the Services cannot consult on recommended minimization measures or BMPs; they must be implemented as part of the proposed project):

- Monitoring plans
- Contingency plans
- BMPs to be implemented during project construction and operation.

If a project requires in-water work, it is important to analyze the types of impacts on suitable fish habitat and critical habitat that may result from the proposed action. Discuss the in-water activities specifically and in detail. The following topics should be considered:

- Total area to be covered by riprap, and the portion of riprap above or below the OHWM
- Type and amount of vegetation being removed (especially riparian)
- Plans to incorporate vegetation or rootwads into the riprap
- Quantity of sediment generated and imported into water bodies
- Any potential take associated with placement activities
- Method of placement
- Impacts on relevant indicators (e.g., floodplain connectivity, width-to-depth ratios, stream bank condition)

- Acceleration of erosion rates and energy transfer to downstream environments
- Effects on instream habitats
- Riprap classification
- Existing conditions
- Post-project conditions
- Specific BMPs to be implemented by project proponents to minimize impacts
- Any proposed enhancement actions for the species habitat (usually these beneficial effects are non-contemporaneous)
- Discussion of activities in relation to all fish life stages.

For a project that may have an impact on terrestrial species, the project biologist should quantify the following types of predicted impacts, insofar as possible:

- Vegetation to be removed or altered by the proposed action
- Whether suitable habitat will sustain impacts and to what extent
- Whether critical habitat will sustain impacts and to what extent
- Whether project noise will increase ambient noise levels above the existing threshold, potentially influencing the behavior of birds or wildlife in the vicinity of the project.

A detailed quantitative description of these impacts is required in order to give reviewers a clear sense of what the direct impacts of the project entail. Topics a project biologist might address in this section include (but are not limited to) the following:

- Number of nest trees to be removed or affected
- Distance of these trees from the project area
- Number of trees with suitable murrelet platforms in the action area
- Anticipated extent (i.e., range, level, and duration) of construction-related noise impacts
- Distance of known den sites, rendezvous sites, and prey concentration areas from the action area
- Suitability of habitat for listed species, and anticipated impacts
- Extent of impacts on suitable habitat

- Timing of the project in relation to species use of the area.

The analysis of effects should be completed separately for each listed species to facilitate making effect determinations for each species, to be consistent with the new WSDOT BA form, and to acknowledge that the project may affect various species differently. For example, the direct effects, indirect effects, effects associated with interrelated and interdependent actions, and cumulative effects should be analyzed for bull trout, then for bald eagle, then for chinook salmon, and so on. The specific subsections included in the analysis of effects, as required under the ESA, are discussed below.

3.10.1 Direct Effects

This section of a BA addresses the potential for direct impacts on species (listed or proposed), suitable habitat, critical habitat, and food resources in the vicinity of the project.

3.10.1.1 Terrestrial Environment

When examining direct effects on specific wildlife and plants, evaluate the potential for exposure by identifying and quantifying all impacts anticipated to result from construction, including but not limited to, disturbances from noise, visual impacts, vibration, and human activity levels during construction. If a species or designated critical habitat will "co-occur" with direct effects, then there is potential for the species or habitat to be exposed to the impact. For each species, if the potential for exposure can be established, the biologist should complete a response analysis for each applicable impact.

Some useful tools or considerations for completing the analyses are provided below:

- Injury or disturbance thresholds associated with different noise levels have recently been established by USFWS (2003) for murrelets, bald eagles, and spotted owls (refer to PART 2, NOISE IMPACT ASSESSMENT for more information on this topic).

- Refer to the wildlife sensitive periods calendar (PART 3, WILDLIFE SENSITIVE PERIODS CALENDAR) to determine whether the project occurs during the breeding period or another sensitive period for nearby wildlife. Placing timing restrictions on a project to avoid work during these sensitive periods can minimize or avoid direct impacts on listed species.

- Biologists may be able to correctly identify listed plants in the field only when species are in bloom (see PART 3, IDENTIFICATION WINDOW FOR THREATENED AND ENDANGERED PLANTS IN WASHINGTON STATE).

When examining direct effects on habitat for wildlife and plants, identify all habitat types (including suitable and critical habitat) in the project action area that would be affected by the proposed action. Determine whether these habitats are occupied by a listed species. Quantify

impacts on habitat in and surrounding the proposed project (e.g., acreage of clearing and grubbing, cut and fill, and number of trees removed). Identify clearly whether the project will have an impact on suitable or critical habitat, or whether species will be disturbed or displaced as a result of these impacts (e.g., their behavior is affected, access to habitats is cut off, or a portion of their habitat is lost). The effects of the action on existing environmental baseline should be evaluated and systematically documented.

3.10.1.2 Aquatic Environment

When examining direct effects on a specific fish species, identify and quantify all impacts on aquatic systems that are anticipated and could affect the species, including but not limited to sedimentation and the extent and duration of in-water work. Determine the run timing for listed fish in the vicinity of the project by contacting the WDFW local area habitat biologist or other local experts. Impacts on fish can be minimized or avoided by conducting work outside sensitive time periods (spawning, rearing, or migration) or when fish are not present in the vicinity of the project.

Identify and quantify all impacts on aquatic habitats, which in turn could affect the species or critical habitat, including but not limited to placement of riprap (note its position in relation to the OHWM), removal of riparian vegetation, sediment disturbance, and underwater noise impacts related to pile driving. Clearly identify whether the affected habitats are critical habitats or provide habitat for important life history stages (i.e., spawning, rearing, and migrating).

The effects of the action on the environmental baseline conditions and PCEs in the project action area should be evaluated and systematically documented. If bull trout occur in the vicinity of the project, the USFWS baseline indicator checklist should be completed. If salmonids regulated by NOAA Fisheries occur in the project action area, the NOAA Fisheries checklist should be completed (see PART 2, ENVIRONMENTAL BASELINE WITHIN THE ACTION AREA or the compact disc accompanying this manual). When both NOAA Fisheries and USFWS freshwater species are present, environmental baseline conditions can be summarized in a single combined matrix.

These pathways and indicators matrices apply only to freshwater riverine areas. When evaluating marine or lacustrine systems and species, be sure to identify existing environmental conditions or PCEs in the project action area, describe them in detail and explain how these conditions relate to the species being evaluated, and document how the habitat conditions will be influenced by the proposed action.

If the project will result in beneficial direct effects, such as improvement of spawning substrate in the action area resulting from the addition of suitable spawning gravels, include a discussion of these effects in the Direct Effects section of the BA and also summarize these beneficial effects in the Project Benefits section of the BA.

3.10.2 Indirect Effects

This section of a BA addresses indirect impacts on species (listed or proposed), suitable habitat, critical habitat, and food resources in the vicinity of the project. Indirect effects to each species or designated critical habitat are analyzed within the defined project action area. Indirect impacts to species and critical habitats can stem directly or indirectly from future activities related to the project or can result from effects to a prey species, primary constituent elements or important habitat elements.

If the project will result in beneficial indirect effects, include a discussion of them in the Indirect Effects section of the BA and also summarize these beneficial effects in the Project Benefits section of the BA. Beneficial indirect effects might include improved water quality resulting from new stormwater treatment elements installed as part of a project.

3.10.3 Effects of Interdependent and Interrelated Actions or Activities

This section of a BA evaluates the impacts to species and habitats associated with effects from interrelated and interdependent actions or activities. If a species or designated critical habitat will "co-occur" with effects generated by these activities, then there is potential for exposure to the impact. For each species, if the potential for exposure can be established, the biologist should complete a response analysis for each applicable impact.

3.10.4 Compliance with Existing Recovery or Management Plans

If recovery or management plans have been established in the project vicinity that would affect the species or ecosystems in the project action area, the BA should address to what degree the project is in compliance with these plans and their management recommendations. It should be noted that the project may not be in compliance with the recovery or management plan. This discrepancy should be addressed in the Analysis of Effects section of the BA. A listing of available recovery or management plans is provided in PART 3, RECOVERY PLANS.

3.10.5 Potential for Project to Result in Incidental *Take* of Listed Species

Under the ESA (16 U.S.C. §§ 1531 et. seq.), *take* is defined as:

> *To harass, harm, pursue, hunt shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.*

See also PART 3, GLOSSARY AND ABBREVIATIONS.

The potential for the proposed action to incidentally *take* a listed species should be discussed in detail in the BA. A *take* analysis should quantify the number of individuals or the amount of a species' habitat (occupied or designated critical habitat) likely to be lost as a result of the proposed project. The terms and conditions of the incidental *take* statement stipulate the number

of individuals of a species that may be lost. *Take* is not allowed for the entirety of a listed species' habitat or designated critical habitat. *Take* provisions for proposed species or proposed critical habitat may be given in a conference report. (Conferences are required for federal actions likely to jeopardize proposed species or adversely modify proposed critical habitat, and the results are summarized in a conference report.) The *take* prohibition does not extend to candidate species.

The ESA does not limit or provide for the incidental *take* of listed plant species. However, listed plants are afforded some protection under the ESA in that a federal permit is required to remove, reduce population size, or possess endangered plants from areas under federal jurisdiction. A federal permit is also required for any act that would remove, cut, dig up, damage, or destroy any listed species in any other area in knowing violation of any state regulation or in the course of any violation of a state criminal trespass law.

3.10.6 Potential for Project to Jeopardize the Continued Existence of a Proposed Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat

The federal action agency must ensure that its activities are not likely to jeopardize the continued existence of proposed species or result in destruction or adverse modification of proposed critical habitat.

For proposed species, the BA must analyze the potential for the project to jeopardize the continued existence of the species in relation to the impact analyses provided in the preceding sections (including direct effects, indirect effects, and interrelated and interdependent activities). This jeopardy analysis pertains to the entire species, not to individual animals. However, the provisional effect determination (i.e., NE, NLTAA, or LTAA) that accompanies the jeopardy analysis and conclusion reflects the potential for *take* of individual animals. As a result, a determination of LTAA does not necessitate a jeopardy call of *likely to jeopardize the continued existence* of a proposed species. A clear summary statement of the impacts affecting each proposed species should be included in the Conclusion and Effect Determination section of the BA, which should accompany the final effect statement for proposed species (see PART 2, EFFECT DETERMINATION GUIDANCE). If a project is *likely to adversely affect* (LTAA) a proposed species, a conference with the Services can be requested to secure provisional incidental *take* provisions. If the species became listed prior to completion of the project, the action agency would request that the formal conference be turned into a formal consultation.

For proposed critical habitat, the BA must analyze the potential for the project to affect proposed critical habitat as well as the project's potential for destroying or adversely modifying this habitat. The effect determination conveys whether any impacts on critical habitat will occur. The adverse modification determination assesses the functionality of the proposed critical habitat for a species as a whole. As a result, an LTAA determination does not necessitate a modification determination of *destroy or adversely modify proposed critical habitat*. A clear summary statement of the impacts affecting proposed critical habitat should be included in the Conclusion and Effect Determination section of the BA, which should accompany the final effect statement

for proposed critical habitat (see PART 2, EFFECT DETERMINATION GUIDANCE). If a project is *likely to adversely affect* proposed critical habitat, a conference with the Services can be requested to secure provisional incidental *take* provisions.

The Services are available to assist the federal agency with this determination of effect. A conference can be requested for jeopardy findings on proposed species or adverse modification findings on proposed critical habitat. In addition, if a proposed species will become listed (or a proposed critical habitat will become designated) prior to the completion of the project, a conference can be requested from the Service on NLTAA effect calls (it is not required, however). This will allow the conference concurrence to turn into a consultation concurrence upon request at the time of listing. By including proposed species in the BA, the conference process is completed in conjunction with the consultation process.

3.10.7 Potential for Project to Affect Candidate Species

The analysis of impacts related to project actions can also include candidate species; however, this information is to be included in a BA appendix. The ESA does not require that BAs include an impact analysis of these types of species; however, because projects are frequently delayed by lack of funding or changing priorities, or are not constructed as scheduled, the status or location of a species may change and the BA may require updating. Because projects are often delayed, it is useful to provide a complete analysis of impacts on candidate species as well as listed species, in the event that candidates become listed in the course of the project.

In assessing potential impacts on these species, the project biologist should determine the presence of suitable habitat in or near the project during a site visit. The BA should document the level of use of the project site or vicinity by specific species. The project biologist should then assess direct and indirect impacts to determine project-related impacts upon individuals, populations, and essential habitat components. A clear summary should state whether the action will have significant impacts on populations, individuals, or suitable habitats (occupied or unoccupied). This summary statement (provided for candidate species) should be provided in the Candidate section in the appendix (see PART 2, EFFECT DETERMINATION GUIDANCE).

3.11 Effect Determinations

The project biologist concludes the analysis presented in the BA by summarizing the findings for each species and critical habitat addressed in the effects analysis and generating an effect determination for each species (listed and proposed) and for all critical habitat (designated and proposed) potentially affected by the proposed project.

The federal action agency formally makes the effect determination by accepting the analysis, conclusions, and effect determination of the project biologist and forwarding the BA to the Services for review. The action agency may require revisions to the analysis before submitting the BA to the Services for concurrence. Three potential effect determinations may be made:

- No effect (NE)
- May affect, not likely to adversely affect (NLTAA)
- May affect, likely to adversely affect (LTAA).

An action that results in only beneficial effects on a particular species does not warrant a *no-effect* determination for that species. Such an action warrants a *may affect, not likely to adversely affect* determination and requires informal consultation.

A project typically has several different effect determinations, depending on the listed species and critical habitat affected (e.g., a NE determination for marbled murrelet and spotted owls, a NLTAA determination for bald eagle, and an LTAA determination for chinook salmon).

An example is provided below of a good conclusion statement for a BA that summarizes the anticipated impacts of the proposed action in relation to listed aquatic species. This statement would be followed in the BA by an effect determination:

> The determination of effects for protected salmonids is contingent upon implementation of the previously identified impact minimization measures. The proposed action may have the following potential impacts on bull trout and other salmonids:
>
> 1) The installation of three rock or large woody debris (LWD) stream barbs has the potential to directly disturb or harm fish within the project area (a stream barb is a line of boulders extending part way into the channel to deflect flows, minimizing bank erosion):
>
> - Because bull trout and other salmonids (namely steelhead and coho) are known to occur in Daisy Creek, the project is proposed to occur during the WDFW-designated open work window (give exact dates) when various life forms of fish are least likely to be present in the action area.
> - Rock used for barb construction will be placed individually by excavator arm rather than by dropping or end dumping to the repair site, to minimize any risk of injury to fish.
>
> 2) Stream barb installation will increase the width-to-depth ratio of the channel and cover suitable cobble and gravel substrate. These impacts are expected to adversely affect salmonid habitat, particularly juvenile rearing and adult holding areas. Only the minimum amount of rock needed to construct the barbs will be used. Aspects of the barb installation, however, will improve some baseline conditions for salmonids. Barbs with incorporated LWD will reduce channel velocity and bank erosion potential. Barbs can create velocity refugia for salmonids during high water events and produce scour pools that hold rearing fish during low flow periods.
>
> WSDOT has determined that the environmental baseline in the proposed project action area will be slightly degraded by:

- A short-term increase in turbidity from stream barb construction, reopening of an old stream channel, and placement and anchoring of LWD
- An increase in the width-to-depth ratio of Daisy Creek in the vicinity of the stream barbs.

The environmental baseline in the proposed project action area will be maintained by:

- Permanent stabilization of the west bank and cessation of surface and mass erosion
- The incorporation of LWD into stream barbs and along the west bank line
- Creation of low-energy refugia on the downstream side of the stream barbs during high flows.

A concluding statement such as this clearly illustrates the rationale upon which the following final effect determination has been made, and it justifies the subsequent determinations by briefly recapping relevant supporting evidence (e.g., specific information from field surveys, agency coordination, etc.). The final effect determination for bull trout in this BA states:

Considering the information referenced in this report and project information provided in the construction plans, this project merits an effect determination of **may affect** because:

- There are no barriers to bull trout usage of Daisy Creek
- In-water work will occur.

This project merits a **likely to adversely affect** determination for bull trout because:

- Individual fish could potentially be present during the proposed construction.

More detailed guidance is provided in PART 2, EFFECT DETERMINATION GUIDANCE.

3.12 Reference Citations and Appendices

The following items should be included in the reference section of the final BA or BE:

- All literature citations
- All website citations with URL information
- All personal communication citations.

These reference listings should be detailed enough to enable readers to trace the information source, including author, year of publication, title, volume, publisher, city, and state. Some publications require additional information, such as edition, document series and number, sponsoring agency, program, and inclusive page numbers.

Citations for material obtained online should include the author or agency, date of publication (if evident), title or description of the information, date obtained from the internet, and internet address (URL).

Listings for personal communications should include the names of the persons providing and receiving the information, their affiliations, the nature of the communication (e.g., letter, telephone conversation, meeting, email message, or fax), and the day, month, and year of the communication.

A list of frequently used references and guidance documents is provided in PART 3 of this manual. This list includes general literature citations, species lists, evolutionarily significant unit (ESU) and distinct population segment (DPS) summary information, agency contact information, and website information. Additional information is provided on the reference compact disc accompanying this manual.

Some informational resources may contain details on sensitive information that should not be included in a public document (e.g., nest site locations, congregation areas, or redd sites). The following resources should not be included in any section of the final BA or BE if they contain sensitive information:

- Priority habitat and species maps
- Site-specific resource maps
- Tabular data or survey results.

The following items should be included in the appendices of the final BA or BE:

- Essential fish habitat assessment
- Photographs with photographic log describing picture content
- Simple project plans
- Survey method, protocols, or results
- Species list letters from NOAA Fisheries, USFWS, and the Washington Natural Heritage Program
- General species life history and habitat requirement information

- The hydraulic project approval (HPA) from WDFW, if available; (if an HPA is referenced in the BA (e.g., *construction of the culvert will adhere to the conditions set in the HPA*), the HPA must be provided as an appendix to the BA so that the Services can understand those conditions; if no HPA is available, do not reference it)

- Hydraulic report (optional).